PUBLIC WORKS

July 1955

CITY, COUNTY AND STATE

High Speed Sludge Heating Method 67

Savings Will Pay for Asphalt Equipment . . 70

Stabilizing Roads With Rock Salt 77

Planning Sewer Maintenance Yards . . 85

Two-Way Radio for A Water Department 87

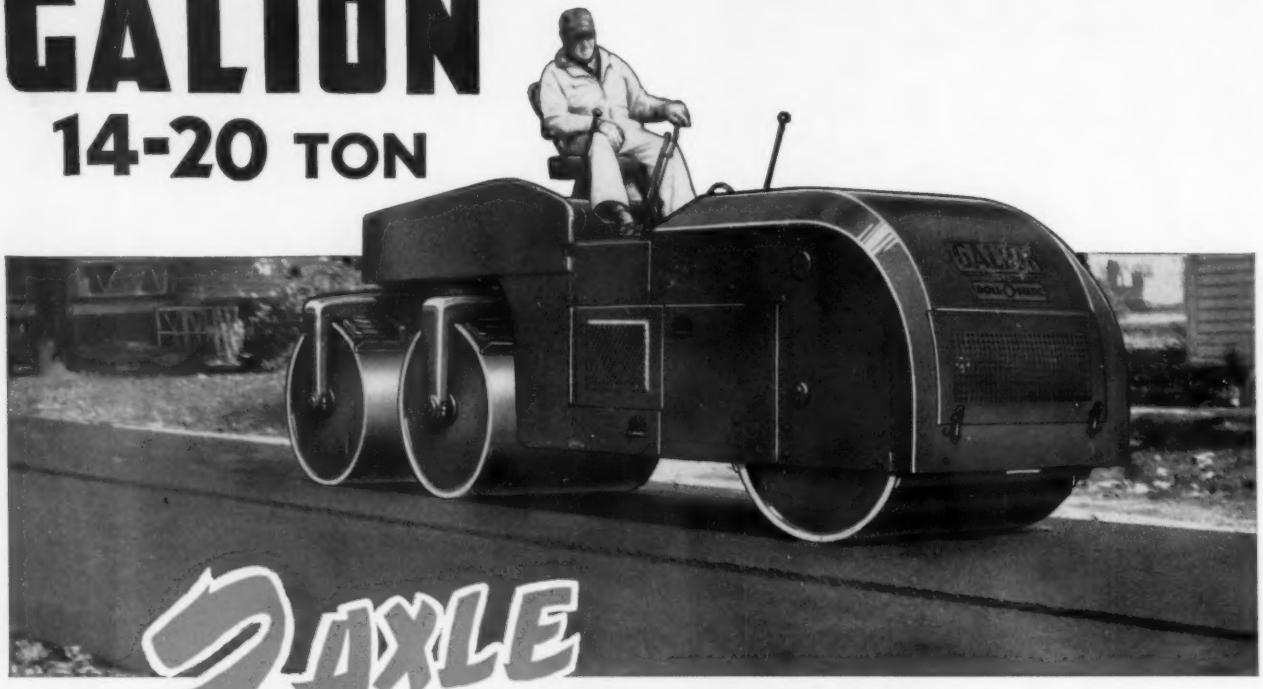
Progress in Saline Water Conversion . . . 92

Funnel Type of Storm Water Inlet . . 96

COMPLETE CONTENTS LIST ON PAGE 5.

Joseph Lustig, City Engineer and Director of Public Works, Janesville, Wisc., is checking the drawdown on a new 6,000-gpm well. The pumping arrangement, unusual and flexible, was designed by him. More on page 56.

GALION
14-20 TON



3 AXLE TANDEM ROLLER

The Galion 3-Axle Tandem Roller gives you a considerably smoother finish surface, and up to 60% greater tonnage of material compacted per day than with conventional tandems. You get faster and better compaction of joints and seams. Elimination of cross-rolling saves you time and money.

Other features include Galion ROLL-O-MATIC Torque Converter Drive . . . Synchronized hydraulic steering of twin guide rolls . . . Dual operating controls . . . Rugged straight-line spur gear final drive . . . Complete and easy accessibility of all operating parts. Write for literature.

*Utilizing a General Motors-Allison Torque Converter

ESTABLISHED GALION 1907

MAIL THIS COUPON TODAY

THE GALION IRON WORKS & MFG. CO.
GALION, OHIO, U.S.A.

ROLL-O-MATIC* TORQUE CONVERTER DRIVE IS STANDARD EQUIPMENT

GALION gives you the most effective and economical driving power obtainable. The ROLL-O-MATIC Torque Converter Drive differs from a fluid coupling drive. A fluid coupling transmission requires a manual gear shift mechanism, and the fluid coupling itself never multiplies engine power.

The Galion ROLL-O-MATIC Torque Converter Drive has no gear shift mechanism. Furthermore, it automatically MULTIPLIES the engine driving force by means of oil in motion instead of by transmission gears. It automatically APPLIES the driving force as the work demands, and automatically MAINTAINS desired roller speed regardless of grade or working conditions. Reversing action is velvet-smooth; shock loads are eliminated.

THE GALION IRON WORKS & MFG. COMPANY
Dept. P-75 Galion, Ohio, U.S.A.

Please send me literature on the Galion Rollers checked.

☐ 3-Axle Tandem ☐ Three-Wheel ☐ Trench
☐ 2-Axle Tandem ☐ Portable

PERSON _____

FIRM _____

STREET _____

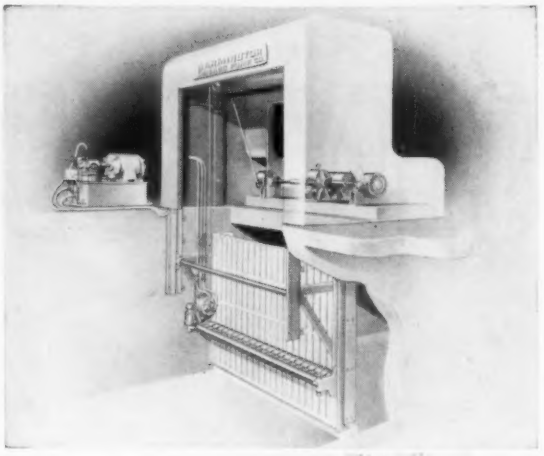
CITY _____ STATE _____

Greater Flexibility in Comminution*

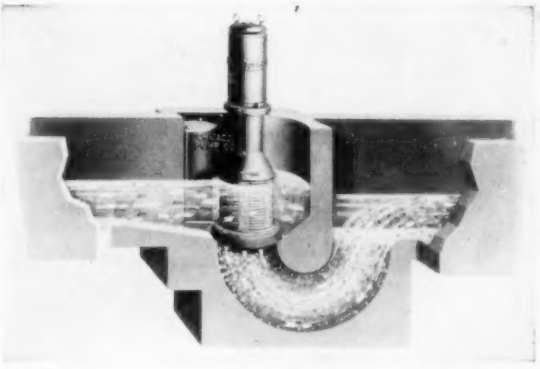
For Sewage Flows From .005 to 250 MGD Per Machine Installed In A 6″ Pipe, A Basin Or A Rectangular Channel Section.

The greater flexibility and wide applicability of comminution made possible by the equipment illustrated here is the result of Chicago Pump Company's original development of comminution and the Comminutor and its 20 years of experience in over 4000 installations of exclusively successful comminution.

**Continuous screening and subsurface cutting of coarse sewage material without removal from the sewage flow, eliminating unsightly mess, nuisance and odor from screenings.*

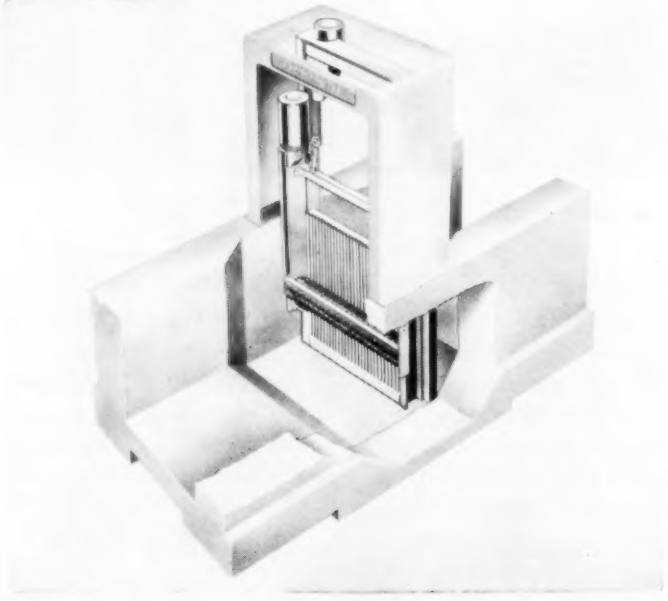


Model "A" Barminutor Screening and Comminuting Machine. Designed for use in rectangular channel sections 4 to 12 feet wide, sized for flows of 10 MGD and upwards.



The Comminutor Screening and Comminuting Machine. Designed for use in hydraulically designed feeder basin, sized for flows from .175 to 25 MGD per machine.

◀ Model "B" Barminutor Screening and Comminuting Machine. Designed for use in rectangular channel sections 1 to 3 feet wide, sized for flows from .09 to 15 MGD.



Model 7B Comminutor Screening and Comminuting Machine. Designed for use in 6″ or 8″ sewer pipe, sized for flows from .005 to .175 MGD per machine.

CHICAGO PUMP COMPANY
Subsidiary of Food Machinery and Chemical Corporation
SEWAGE EQUIPMENT DIVISION
622 DIVERSEY PARKWAY • CHICAGO 14, ILLINOIS

Flush Kleen ®, Scru-Peller ®, Plunger, Horizontal and Vertical Non-Clogs Water Seal Pumping Units, Samplers . . . Swing Diffusers, Stationary Diffusers, Mechanical Aerators, Combination Aerator-Clarifiers, Barminutor ®, Comminutors.

CITY BUDGET BEATER

The City of Greenville, Mississippi, works its three Caterpillar D4 Tractors eight hours a day, right through the year. The machine shown here is backfilling a sewer. But that's only one of its many jobs. It rough-grades streets, bulldozes broken concrete, and trenches and fills at the city sanitary garbage disposal site.

Regardless of the job, the CAT* D4 Tractor is built to do *more work at less cost* than any competitive unit.

That's one big reason for the popularity of the D4 in municipal use. Here are more: It's small enough to operate easily and economically, yet big and powerful enough to handle the vast majority of daily jobs. With 48 drawbar HP, the tractor has a maximum drawbar pull of 10,600 pounds in first gear. The four-cylinder, four-cycle engine is designed for long life and economy. It runs efficiently on non-premium No. 2 furnace fuel.

The husky final drive, heavily braced frame and rugged track assembly are built to stand up under tough working conditions. Effective bellows seals keep mud and dust out of track rollers and hold lubricants in. These and scores of other features enable the Cat D4 Tractor to do more work at less cost to the taxpayers.

Get the full details from your Caterpillar Dealer. He'll demonstrate the tractor on the job and show you actual cost figures that may surprise you. Every machine he sells is backed by good service and genuine parts. Call him today.

Caterpillar Tractor Co., Peoria, Illinois, U. S. A.

CATERPILLAR*

*Both Cat and Caterpillar are registered trademarks—®

NAME THE DATE... YOUR DEALER WILL DEMONSTRATE

OFFICERS

W. A. Hardenbergh, *President*
L. C. Morris, *V. Pres. and Treas.*
Edward B. Rodie, *Secretary*

EDITORIAL DEPARTMENT

A. Prescott Folwell
Editor Emeritus

W. A. Hardenbergh
Editor

Edward B. Rodie
Managing Editor

Frank E. Force
Helen E. Quinn
Associate Editors

George E. Symons
Leo J. Ritter, Jr.
Columnists

Nathaniel Pousette-Dart
Art Consultant

BUSINESS DEPARTMENT

Lewis C. Morris
General Manager

I. James Barger
Assistant Manager

Arthur K. Akers
Director, Advertising & Research

ADVERTISING OFFICES

New York 17, 310 East 45th St.
W. S. Morris, *Eastern Sales Mgr.*

Cleveland 10, Ohio, Villa Beach 2, 15445 Lake Shore Blvd.
Burton M. Yost, *District Mgr.*

Chicago 11, Ill., 612 N. Michigan Ave.
Robert J. Shea, *Mid-West Sales Mgr.*

Los Angeles 36, Calif. 5478 Wilshire Blvd.
Hugh Hollyday, % *Smith & Hollyday*

San Francisco 4, Calif., Russ Building
Bill Smith, % *Smith & Hollyday*

BPA

Public Works T. M. Reg. U.S. Pat. Off.

Established 1896

Published Monthly by Public Works Journal Corporation. Office of Publication at Orange, Conn. Editorial and Advertising offices at 310 East 45th Street, New York 17, N. Y. Subscription rates: U.S.A. and possessions, $5.00. Canada and South America, $6.00. All other countries, $7.00. Single copies 50¢ each, except special issues which are $1. Acceptance under Section 34.64 P. L. & R. Authorized.

Copyright 1955 by
PUBLIC WORKS JOURNAL CORP.
310 East 45th St., New York 17, N. Y.

PUBLIC WORKS MAGAZINE

CONTENTS

July, 1955 **Vol. 86, No. 7**

High Speed Sludge Heating. *By A. A. Furczyk* 67
Savings Will Soon Pay for Our Asphalt Equipment. *By Robert J. Robillard* 70
Use of Sodium Arsenite for Controlling Aquatic Plant Growths. *By John L. Farley* 73
Design for a Small Water Plant. *By Guy Browning Arthur* 74
Most Useful Equipment Reported by Water Departments 76
Rock Salt Stabilization Keeps Our Roads in Shape. *By Robert T. Carrier* 77
Modern Water and Sewage Facilities for a Thousand People. *By Lester Lee* 79
Basic Objectives in Record-Keeping. *By Peter F. Roan* 81
Radar Reduces Accidents. *By Phil Hirsch* 83
Planning Sewer Maintenance Yards and Shops. *By A. A. Appel* 85
Two-Way Radio is an Indispensable Water Department Tool. *By R. A. Thompson, Jr.* 87
Refuse Collection Data Reported by San Francisco 88
New Horizons in Biological Treatment of Domestic Wastes. *By George W. Reid* 89
Building Bridges With Paper Tubes Saves Money. *By W. J. Lutz* 91
Increased Needs for New Water Supplies Lead to Research and Development in Saline Water Conversion. *By Joseph J. Strobel* 92
Chlorinating Water in Elevated Distribution Tanks. *By Edward S. Hopkins* 93
Equipment in the Squaw Peak Filtration Plant 94
A Funnel Type Stormwater Inlet. *By Norman W. Nester and John C. Guillou* 96
Highway Planners Study Electronic Scale Results 98
Structural Plate Bridge Flooring Eliminates Shake, Rattle and Roll. *By H. C. Mabry* 99
How Compressed Air Can Work for a City 100

PUBLIC WORKS DIGESTS

The Sewerage and Refuse Digest 110
The Highway and Airport Digest 118
The Water Works Digest 126
The Industrial Waste Digest 134

DEPARTMENTS AND SECTIONS

The Editor's Page 7
People, Ideas and Events *By "Doc" Symons* 18
Letters to The Editor 24
The Engineers' Library 33
Leaders in Public Works 56
Up Front for Adequate Roads *By "Jack" Ritter* 58
APWA News 103
Washington News 106
New Public Works Equipment 146
Worth Seeing 153
Worth Telling. *By A. K. Akers* 154

THE MOST USEFUL ENGINEERING MAGAZINE FOR CITIES, COUNTIES AND STATES

It's Not TOO LATE!

Your pool can still be inviting . . . appealing . . . this season.

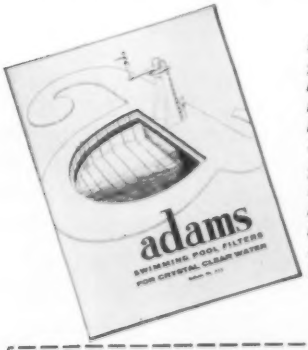
Now you've opened your pool to the public, maybe you have found the old filters just can't handle the heavy bather load . . . your water looks murky . . . swimmers don't come back—and you know how people love to find fault and talk.

You still have a chance to save this season!

Order your Adams Filter... Now!

We keep a stock of most sizes of the popular Adams SPF swimming pool filters on hand. You can order today and get quick delivery. Chances are you'll still end up ahead for the season. But don't delay. It's not too late — *now.*

Hundreds of people daily enjoy a cool refreshing swim in these three public pools. Adams filters keep their waters beautifully clean.



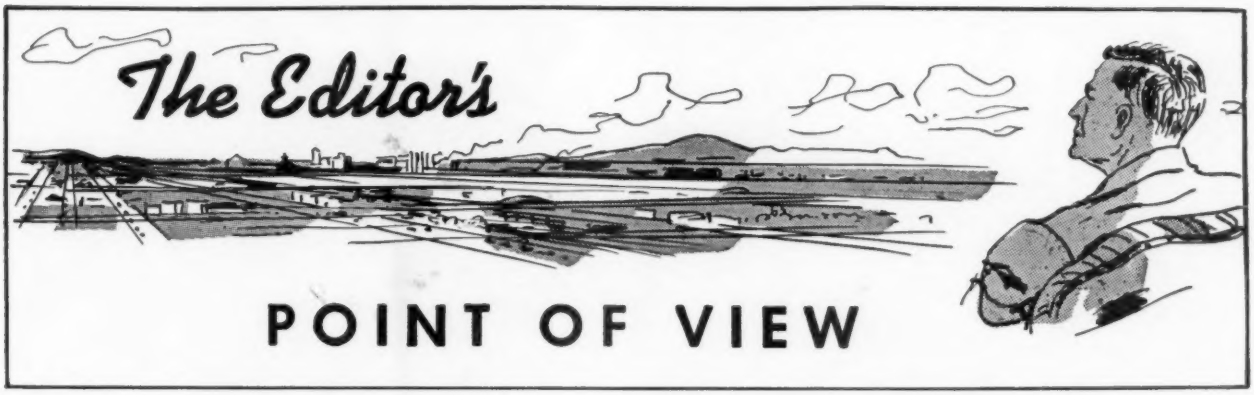
If you have—or are planning — a public pool with more than 50,000 gallons capacity, you'll want this NEW 24 page Adams SPF Bulletin. Mail the handy coupon below and we'll rush it to you by return mail.

R. P. ADAMS COMPANY, INC.
228 East Park Drive, Buffalo 17, N. Y.
Please send me by return mail your new Bulletin 625.

Name.....
Title.....
Business.....
Street.....
City.....*State*.....
Size of pool is.....*gallons.*

R. P. ADAMS CO., INC.
228 East Park Drive Buffalo 17, N. Y.

Get full details of this month's products . . . mail your Readers' Service card today.



A Welcome; a Parting; and Honors for One of our Staff Members

WE welcome to our editorial staff Frank E. Force who joined us June 1. A graduate of the Ohio State University, Mr. Force spent three years with the Ohio State Highway Department and more recently has been city engineer of Kent, Ohio. Our convention-going readers will have the chance to meet Mr. and Mrs. Force (a former air-line hostess) at some of the fall get-togethers.

With regret, we announce that George E. Symons, "Doc" to most everyone, will be unable to continue his column after the August issue. He has taken on additional work obligations—the sign of the able operator—and can no longer find the time to spell out the news from Brushy Bend and collect (and edit) the Swedefinitions for which he is so justly famous.

Honors in the art field have come to Nathaniel Pousette-Dart, long-time director of layout, art and good taste for PUBLIC WORKS. At the annual meeting of Committee Chairmen in May, the Art Directors Club conferred on him a special Award of Merit for his distinguished services to the Club. Mr. Pousette-Dart has taken an active part in Art Club activities for many years and was recently made a life member. At present, under sponsorship of the Club, he is editing a book on the "Profession of Art Directing" which will be published this coming spring; and he has just completed a book on "Painting in America" which will be published this fall. Hastings House will handle both books.

Learning Where and How to Use Modern Equipment

ONE of the essentials in catching up with our public works needs is to learn to do our routine maintenance work at less cost and faster—such work as street repair and maintenance, water system extensions and repairs and sewer maintenance and construction. There are available many kinds of modern power-operated equipment that can reduce costs and speed up the work. Most engineers know about this equipment, but not so many of them appreciate from first-hand observation just how many things this equipment can do and what savings in cost it can accomplish.

We suggest that our various associations plan demonstrations of this nature at their annual and sectional meetings. Admittedly there are difficulties and problems connected with staging such a demonstration; but these can be overcome. Motion pictures can be used to a considerable extent, and it is believed that many manufacturers would cooperate in these demonstrations and in producing educational films.

Design is always important, but so is construction and maintenance. Words are fairly good for a design discussion; but a first hand view of actual performances or, next best, moving pictures showing such performances, are necessary to teach our engineers the many things our modern equipment can do quicker, better and cheaper.

Cutting Municipal Costs by Better Engineering

SOME complaints reach us about the impossibility of doing today all the things that a modern city (or county) needs to do with the money available. At times, one is almost led to believe that tax moneys are no greater than they were forty years ago. Yet for every complaint that comes in, we get an article telling how someone has managed to do a better and an adequate job on today's tax moneys. The secret may be a better use of modern equipment, with greatly reduced costs of doing work; it may be the development of a new type of road base that can be built cheaply from materials locally available; or it may be any one of a dozen other products of intelligence, good thinking and smart engineering.

We think that our engineers are fully capable of meeting these problems of doing more work on less money; some will arrive at a sound solution quicker than others, but all have it within their power to solve these problems. In doing this, however, engineers need understanding support from the public and from the elected officials; they also need, if they are to get this support, a better understanding of public relations and a better knowledge of how to deal with non-technical men.

ROTO 125 operated two 80 lb. pavement breakers at full efficiency on this conduit job, line cutting and breaking 1200 sq. ft. of brick under asphalt per 8 hour shift with an average consumption of only 1½ gallons of fuel per hour.

Now we can announce what users have known for a year

Jaeger Roto air-plus is the first

Instant air delivery, exactly regulated to demand, maintains constant pressure as smooth as steam.

High efficiency results in slower operating speeds, the lowest fuel consumption and longest engine life of any rotary compressor.

After 5 years development work, Jaeger engineers perfected the first fully efficient 2-stage oil-cooled rotary compressor early in 1954. Since then, Jaeger "Roto" units have logged thousands of hours on all types of application from street work to heavy rock drilling and pile driving.

Performance has consistently excelled even the best of other rotary compressors. On typical quarry work, for example, operating two 4″ wagon drills with air-tugger hoists in hard limestone, 10 hours a day, a Jaeger Roto "600" averaged 7 gallons of fuel an hour in 2200 hours of operation. Its engine never ran faster than 1600 rpm. A Roto "125", handling the air demands of two heavy duty paving breakers, shows an equivalently low fuel consumption of approximately 1½ gallons an hour.

Simple, close, continuous control

Control of engine and compressor is so effective that 100 lbs. minimum pressure is constantly maintained over the entire operating range. Speed modulation is smooth and stepless. Instantaneous control positively prevents overrun and resultant racing of the engine. Furthermore, controls are extremely simple, without metering orifices, complex linkage or toggles. When starting, you merely make one half-turn of a regulator crank to set engine fuel control on "Idle." All controls are conveniently grouped on one side of the compressor.

It's a fact . . . our handy Readers' Service card is the way to get new catalogs.

ROTO 600, holding steady 100 lbs. pressure for 160 working hours (as smooth as steam) kept this Vulcan No. 1 hammer hitting 60 full power blows per minute, with air to spare for breaker and clay spade work.

fully efficient rotary compressor

There are many further advantages. Jaeger's copper tube finned multi-pass oil cooler insures cool operation in over 100° weather. Automatic by-pass valve means no "dry starts" in cold weather. Multiple perforated disc oil filters won't corrode, absorb or freeze. Adjustable radiator shutters maintain engine water temperature on sub-zero days. All sizes have accessible 8-hour fuel tanks. Tool boxes on the "125" hold a full set of tools.

Available in 125 and 600 cfm sizes

To meet the principal demands of users who prefer the rotary type compressor, current production of the Jaeger "Roto" is concentrated in the popular 125 and 600 cfm sizes. *For the many air users who still prefer the piston type, Jaeger reciprocating Air-Plus compressors continue to be available in the "new standard" ratings with the exception of the 600 cfm size.*

For complete information see your Jaeger distributor or send for Catalog JCR-5.

THE JAEGER

MACHINE COMPANY

400 Dublin Avenue, Columbus 16, Ohio

PUMPS • LOADERS • MIXERS

TRUCK MIXERS • PAVING MACHINES

M-B PACKER BODY puts the SQUEEZE on garbage collection costs

Thorough, powerful, progressive compaction...M-B compacts more tonnage per cubic yard of capacity

You collect more garbage per trip—cover more blocks per trip—make less trips to the dump per day with an M-B Packer Body. The reason—greater compaction!

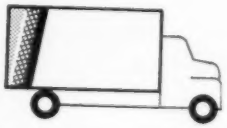
Every yard of refuse that goes into an M-B Packer is *progressively compacted* from the first yard to the last—over and over again with each successive cycle. That's why you can compact more pounds of garbage per cubic yard of capacity with an M-B than with any other unit. Square body means no wasted corners or pockets—and high packing pressure means fewer compaction cycles.

When you're selecting a collection unit—remember—it's the weight you *pack in the body* that pays off! Get all the facts on the M-B Packer Body—write or call M-B Corporation, New Holstein, Wis.

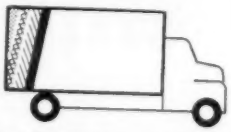
• Costs less to own—to operate—to maintain • Safest in every phase of operation • Fastest in every phase of operation • Versatile—use as truck or van

M-B PACKER gives you progressive compaction of the entire load

Loadings for the first packing cycle are compacted under a force of about 1,000 lbs. per sq. ft.



Loadings for the second cycle are compacted under the same force—and the refuse from cycle 1 gets another thorough compaction in the process.



Loadings for packing cycle 3 are then compacted, during which process, loadings from both cycle 1 and cycle 2 get another thorough compressing from the powerful M-B Plate. This is how M-B's progressive compaction assures complete compaction of the entire load.

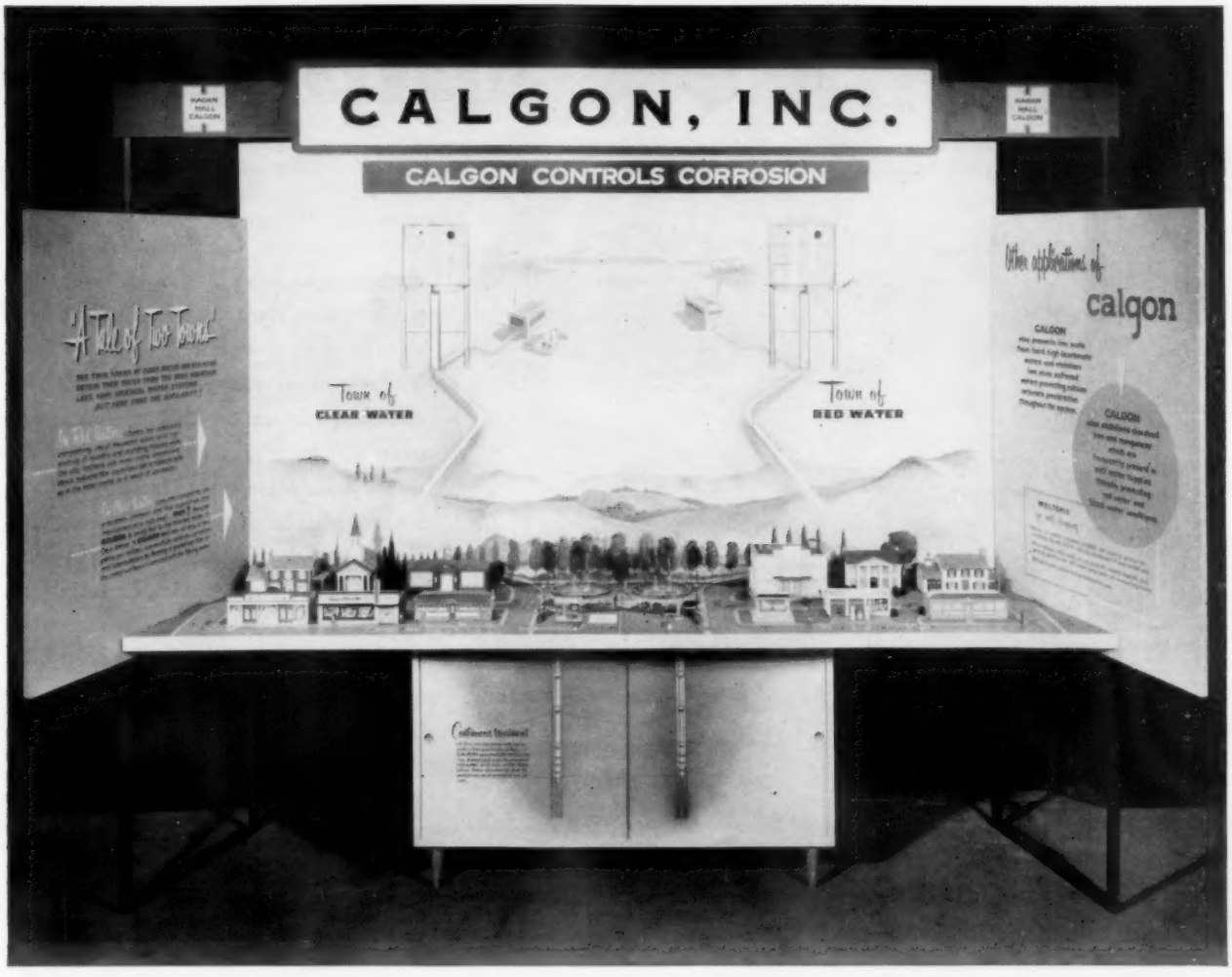
PACKER BODIES • LINE MARKERS • SWEEPERS • PAINTS AND BEADS

MB CORPORATION NEW HOLSTEIN WIS.

MANUFACTURERS OF QUALITY MUNICIPAL AND CONSTRUCTION EQUIPMENT SINCE 1907

Need more facts about advertised products? Mail your Readers' Service card now.

Now's the time to mail this month's Readers' Service card.



TOWN FIGHTS "RED" MENACE!

Visitors to the recent AWWA convention saw how the town of "Clear Water" rid itself of the Red Water Problem with Calgon* Threshold Treatment

This graphic display, showing how Calgon works, demonstrated a method of water control familiar to water works superintendents from coast to coast. They know from experience that Calgon not only stabilizes dissolved iron and manganese (preventing red or black water) but also controls corrosion† and tuberculation by forming a protective film on metal surfaces.

Calgon is effective against lime scale formation, too, and stabilizes lime soda softened water to control calcium carbonate precipitation.

Many years of experience with water conditions all over the country are at your service. Write or phone for information about your particular problem.

*Calgon is the Registered Trade Mark of Calgon, Inc. for its glassy phosphate (sodium hexametaphosphate) products.

†Fully licensed for use under U.S. patent 2,337,856 and 2,304,850.

CALGON, INC.

A SUBSIDIARY OF HAGAN CORPORATION

HAGAN BUILDING • PITTSBURGH 30, PA.

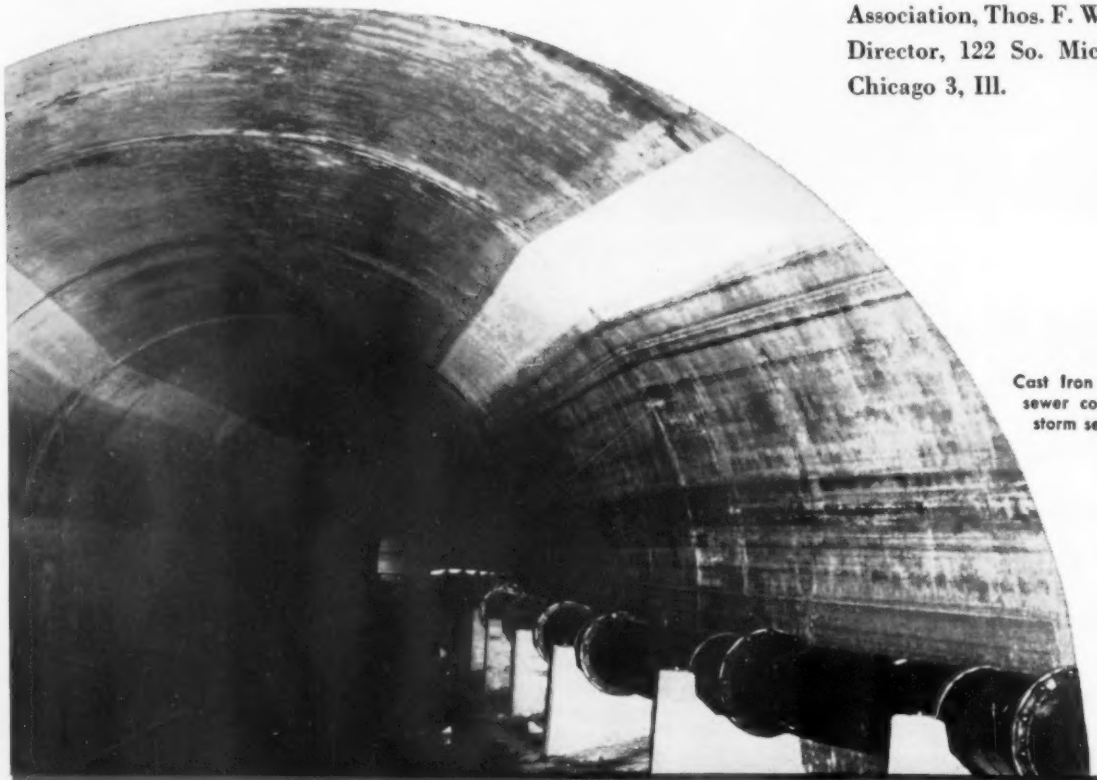
Get full details of this month's products . . . mail your Readers' Service card today.

Need more facts about advertised products? Mail your readers' service card now.

a TOUGH pipe for

Industrial waste and other piping for large manufacturer in suburban Chicago, Ill.

Cast iron pipe has been famed for centuries as a rugged material with proved ability to withstand beam, compressive and shock stresses. Today's *modernized* cast iron pipe—centrifugally cast—is even tougher, even stronger and more uniform in quality. Its effective resistance to corrosion, plus high strength factors, ensure long life, underground or underwater. When an engineer needs a tough pipe for tough requirements, his first and last thought are usually: *specify cast iron pipe.* For information write Cast Iron Pipe Research Association, Thos. F. Wolfe, Managing Director, 122 So. Michigan Avenue, Chicago 3, Ill.



Cast Iron Pipe relief sanitary sewer constructed in existing storm sewer: Tulsa, Okla.

CAST IRON PIPE

Thousands use our Readers' Service card to keep up to date . . . do you?

Get full details of this month's products . . . mail your Readers' Service card today.

TOUGH requirements

Unloading 16" Cast Iron Pipe for water supply system at Ft. Lauderdale, Fla.

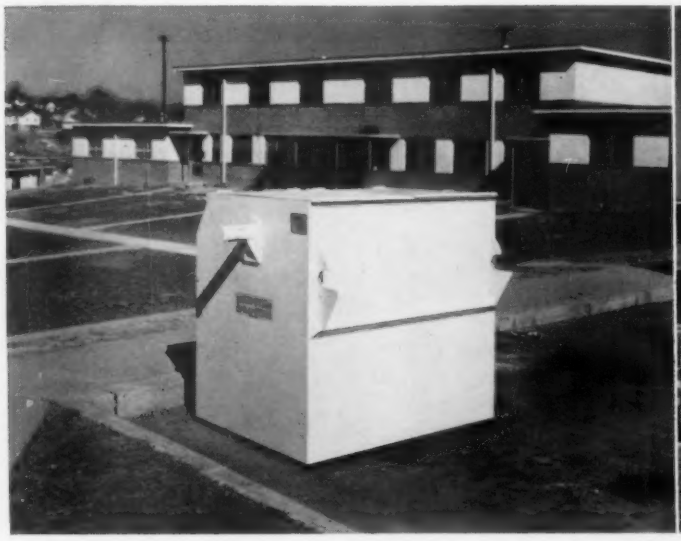
Installing Cast Iron gas main in Chicago's North Side.

Cast Iron ball-and-socket joint water supply line being installed in channel bottom between Terminal Island and outer Los Angeles harbor.

SERVES FOR CENTURIES...

It's a fact . . . our handy Readers' Service card is the way to get new catalogs.

NEW DEMPSTER-DUMPMASTER Front-end Refuse



Revolutionary equipment serves scores of containers—picking each up hydraulically and emptying into compaction type body!

The Dempster-Dumpmaster's flexibility includes safe front-end-collection of refuse from conventional cans in alley pick up. Men are always in safe area in full sight of driver.

WITH THIS NEW Dempster-Dumpmaster for handling refuse in 1¼, 2 and 3 cu. yd. containers and the Dempster-Dumpster for handling bulk refuse in 6 to 15 cu. yd. containers, refuse collection is now a near-science! Necessity of operating several conventional trucks with crews is eliminated. Unsanitary, fire-hazardous and inadequate conventional trash cans, barrels, etc. can be removed from your business districts, housing and apartment areas, schools, hospitals, etc.

Where containers of limited capacity are preferred, the Dempster-Dumpmaster is the solution to the costly and unsanitary methods of collection because of a multitude of reasons, including: Detachable Containers always remain at accumulation point. They may be placed in or outside buildings. Only one man, the driver, is required for complete operation. It hydraulically picks up each container and dumps refuse into compaction type body for maximum loads. No equipment approaches its flexibility for general service, including safe alley pick up of refuse from conventional cans with only a 24-inch height for dumping cans, and with men always in full view of driver you have safe front-end-collection at all times. Too, it's faster because refuse is compacted while container is being loaded. By promising such extraordinary economies and meticulous sanitation, the Dempster-Dumpmaster merits thorough investigation by any city or town, regardless of size. Ask us to send you complete information. Dempster Brothers, Inc.

Filling Stations are one of many types of service establishments that need fire-proof Dempster-Dumpmaster Containers.

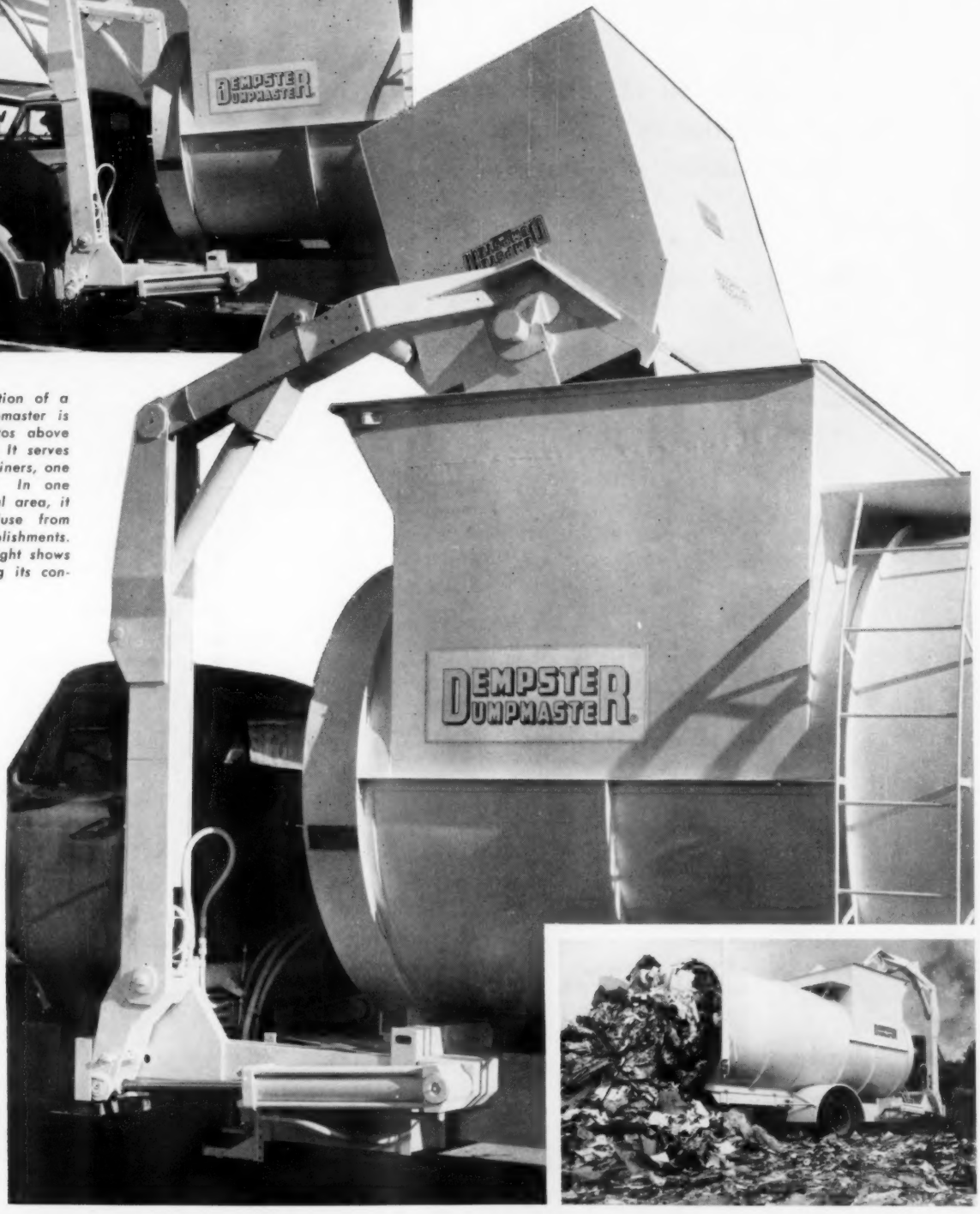
Schools, Hospitals are among the institutions that use these containers; benefiting by the sanitation and low cost.

Restaurants are just one type of many business establishments in your city desiring these scavenger-proof, rat-proof containers.

Casters are available on Containers when needed for location at convenient refuse accumulation areas outside or inside buildings.

gives you Safe, Sanitary Collection at a New Low Cost!

The simple action of a Dempster-Dumpmaster is shown in photos above and at right. It serves scores of containers, one after another. In one trip to disposal area, it hauls the refuse from many establishments. Photo below right shows unit disgorging its contents.

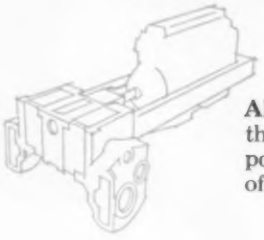


DEMPSTER BROTHERS, 975 Dempster Bldg., Knoxville 17, Tennessee

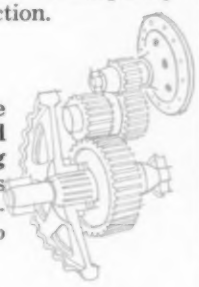
Allis-Chalmers presents the new

ANOTHER BIG STEP AHEAD IN LOW-COST DIRT MOVING

. . . with all the important performance advantages of Allis-Chalmers advanced basic design . . . tested and proved over millions of operating hours!

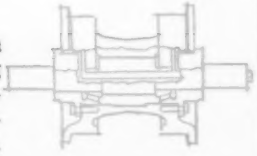


All-Steel Box-A Main Frame that soaks up shock loads, makes possible the service simplicity of unit construction.

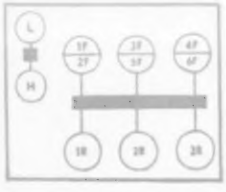


Exclusive One-Piece Steering Clutch and Final Drive Housing with all final drive gears straddle-mounted on tapered roller bearings to insure long life.

Unit Construction lets you remove engine, master clutch, transmission, steering clutches and final drives without disturbing adjacent parts.

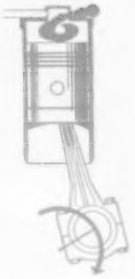


1,000-Hour Lubrication Intervals for roller bearing truck wheels, idlers and support rollers . . . makes production time out of service time.



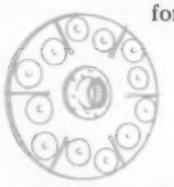
Dual-Range Constant-Mesh Transmission lets you go from any forward speed to any reverse speed by shifting only one lever. Eliminates double shifting! That means faster work cycles . . . more production!

plus . . . these great new features:



New Allis-Chalmers Diesel Engine with "follow-through" combustion and tornado turbulence . . . for smooth engine performance, cleaner combustion, extra long engine life.

New Wrap-Around Radiator Guard used as dozer lift frame to simplify design, reduce cost of bulldozer; guard tilts forward for easy service.



New Master Clutch with Ceramic Lining sets new standards of clutch life . . . with fewer adjustments required.

New Operator Convenience including roomy, flat platform . . . foam rubber seat . . . 24-volt direct electric starting . . . 60-gal. fuel tank.

Tough New Track — New design, through-hardened with extra toughness for long life even in severe abrasive conditions.

PLUS . . . new, all-weather cooling; independent radiator-core mounting; new strength and capacity in final drive gears, shafts and bearings.

NEW STANDARDS OF PERFORMANCE AND LONG LIFE ON A WIDE RANGE OF JOBS

You owe it to yourself to investigate the performance advantages of the HD-11 . . . newest addition to the Allis-Chalmers leadership line. See your nearby Allis-Chalmers dealer now.

Get full details of this month's products . . . mail your Readers' Service card today.

HD-11

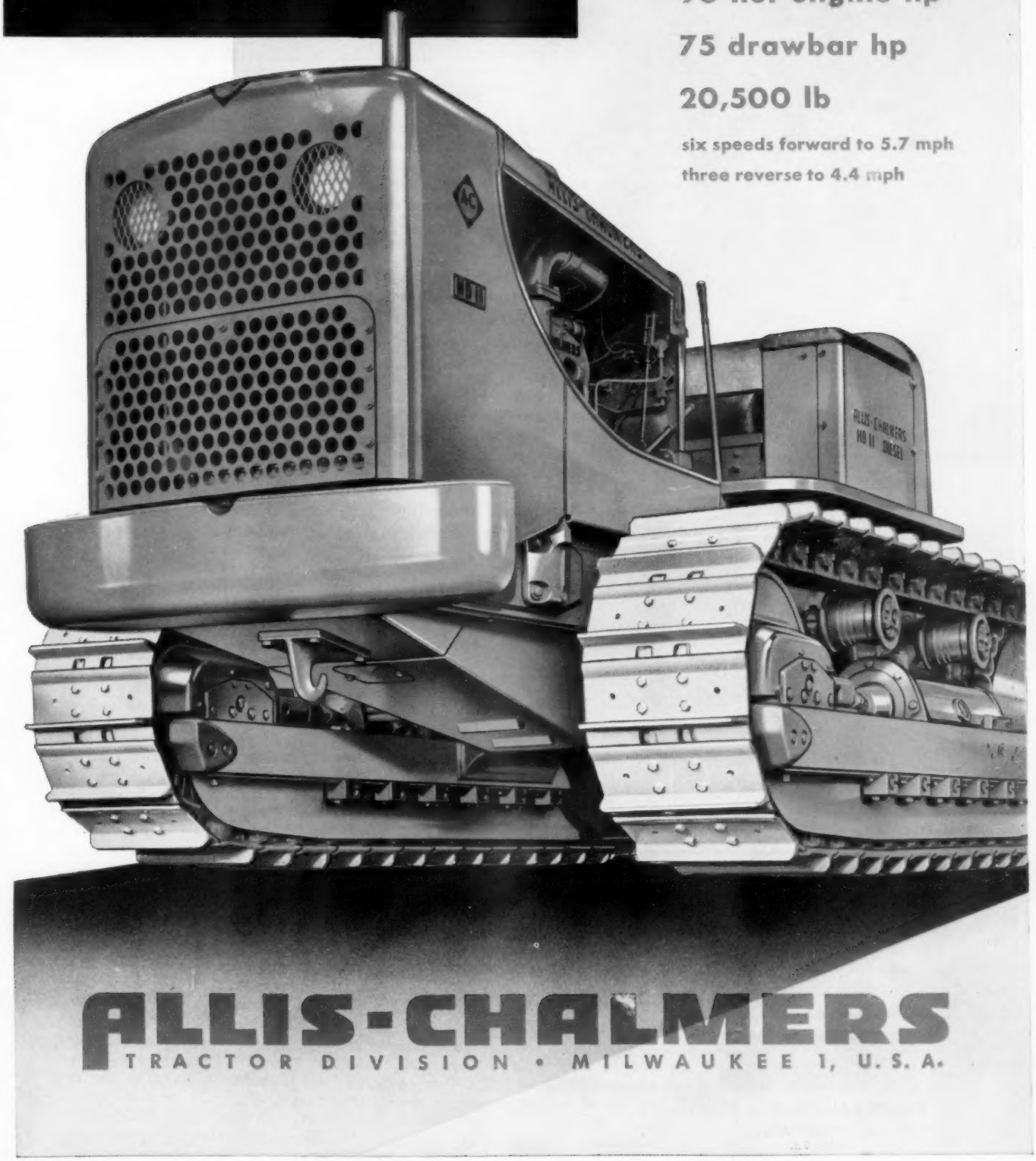
90 net engine hp

75 drawbar hp

20,500 lb

six speeds forward to 5.7 mph

three reverse to 4.4 mph



ALLIS-CHALMERS

TRACTOR DIVISION • MILWAUKEE 1, U. S. A.

Thousands use our Readers' Service card to keep up to date . . . do you?

Get full details of this month's products . . . mail your Readers' Service card today.

BUILD BETTER SEWER LINES

with

WESTON

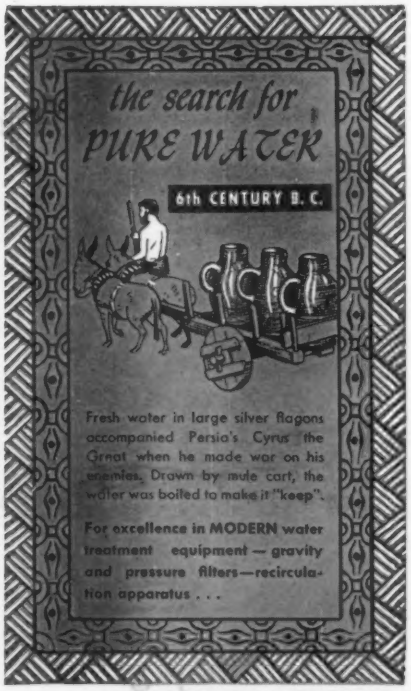
GASKETS and FORMS

for

SEWER PIPE JOINTS
(a cement joint)

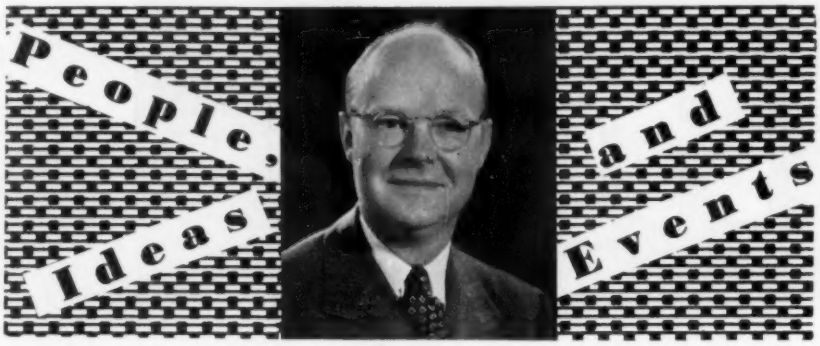
• No jute used—gasket centers spigot. • Definite space in each joint for cement. • Form confines cement-grout to lower portion of joint. • Particularly advantageous in water-bearing trenches. • Infiltration minimized.

L. A. WESTON CO.
Adams Mass.


the search for
PURE WATER
6th CENTURY B. C.
Fresh water in large silver flagons accompanied Persia's Cyrus the Great when he made war on his enemies. Drawn by mule cart, the water was boiled to make it "keep".
For excellence in MODERN water treatment equipment — gravity and pressure filters—recirculation apparatus . . .

MECHANICAL EQUIPMENT BY ROBERTS FILTER MFG. CO. DARBY, PENNA.

ROBERTS FILTER MFG. CO.
640 Columbia Ave.
Darby, Pa.



by "Doc" Symons

H.T.M.A. —And this is the summer season. For a few months, conventions and technical meetings are over. Water shortages, tastes and odors and vacations now occupy the minds of water works men while stream pollution, filter flies and industrial wastes are in the thoughts of sewage plant operators. Come next fall and we'll be back on the convention circuit.

★ ★ ★

Yesteryear — One of my favorite persons in this water works game is Art Kuranz, Manager of the Water Utility in Waukesha, Wis.—You'll know why when you read this press clipping from the *Waukesha Freeman's* column "Yesteryears on Broadway"—Note the original date "Saturday, March 18, 1933.

"Water Commissioner Arthur Kuranz is considering enlarging his department to include a bath inspector. A woman called up this week and reported that her quarterly water bill was $2.10, which is 10 cents above the minimum charge. Of course she wanted to know why the bill was higher than usual.

" 'You must have used more water,' was the reply.

" 'But I don't understand how I could have,' the patron returned, 'Except that I take a lot of baths and I am quite a large person.'

" 'But madam, the commissioner returned, 'the larger you are the less water you use when taking a bath, so it can't be that.' "

(I'm indebted for the clipping to Harold Bugg, Sales Repr. B-I-F Industries, Inc., Chicago office.)

★ ★ ★

Purely Personal — or "move over a little farther, Doc."—From our local paper of June 10th—"James M. Symons, son of Dr. and Mrs. George E. Symons of Larchmont, today received a Master of Science degree in Sanitary Engineering from Massachusetts Institute of Technology. Last month he was elected to the Society of Sigma Xi, honorary science and research fraternity. Mr. Symons' thesis was on "Nitrogen Fixation in the Activated Sludge Process." He is a graduate of Mamaroneck High School in 1949 and received a Bachelor of Civil Engineering degree, with distinction, from Cornell University in 1954. He has published four articles to date and in September will begin his studies for the degree of Doctor of Science in Sanitary Engineering."—*move over Doc!*

★ ★ ★

When the Royal Air Force discovered Gremlins some years ago, and named them as culprits in so many unexplainable things that happen to an airplane, every other industry and profession began to find them. The chemists called them Chemlins, and noted that the "Chemlins favorite sleeping place is the stem of a pressure gauge, and the pressure may change from 50 to 100 pounds without disturbing either him or the gauge."

Some persons think we should invent a name for the breed that inhabit water and sewage plants, but they forget the principles of evolution. All things came from one cell and through the development of the fish, the amphibian, the bird, quadruped and biped. Thus all things, including those that fly, evolved from water. So, too, the Gremlin, and it is in water that his evolutionary ancestors still perform. Who else would eat a hole in a water pipe just where it goes into a concrete wall; who else would test his strength by seeing how long he could hold down a float valve, or plaster the inside of a raw sludge line with grease; or paint a gas relief valve with glue so it won't open when the pressure goes up. And how about that little devil that insists on cutting all your nice

Thousands use our Readers' Service card to keep up to date . . . do you?

STOP costly infiltration...

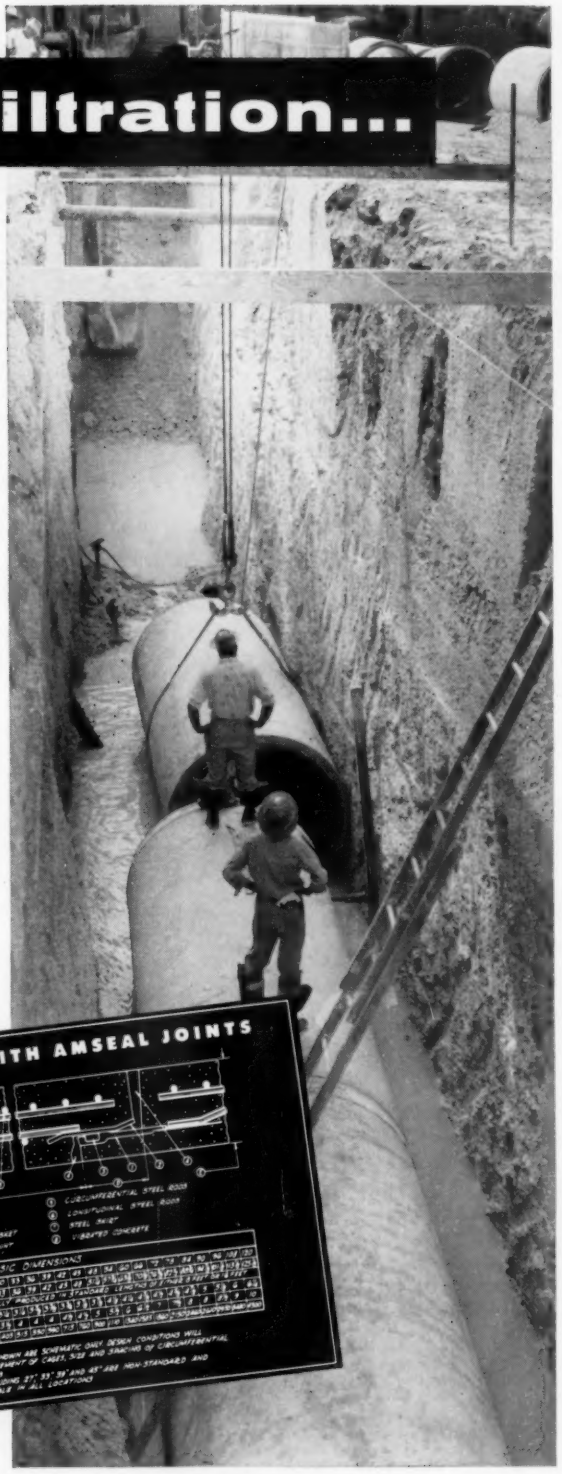
specify

AMSEAL JOINTS

Contractors appreciate the simplicity and economy of installing precast concrete pipe furnished with foolproof AMSEAL Joints—particularly where trench conditions are wet and troublesome. The continuous, round rubber gasket assures a watertight seal against infiltration or leakage. AMSEAL Joints provide the necessary flexibility to permit normal expansion, contraction, deflection and settlement without reducing their effectiveness.

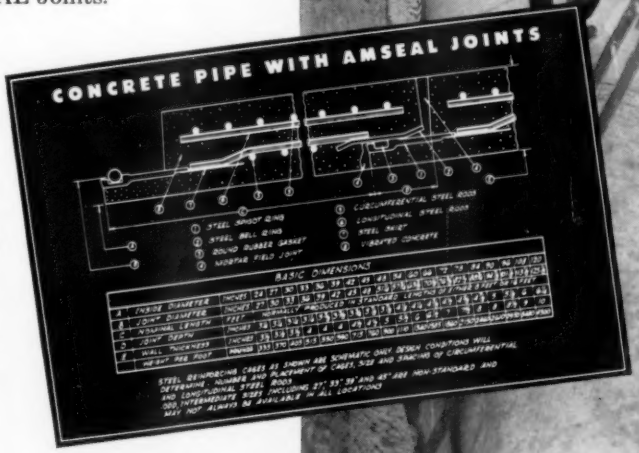
The efficiency and long life of AMSEAL Joints results in *greater economy*—through savings in the construction, operation and maintenance of sewage pumping and treatment facilities. With pipe lengths of 16 feet, there is less joining—less time on the job. Inside surfaces are smooth for maximum capacity.

Write today for specifications on precast concrete pipe with trouble-free AMSEAL Joints.



This "pressure proven joint" is furnished on low pressure concrete pipe for:

- INVERTED SIPHONS
- WATER INTAKE LINES
- INTERCEPTING SEWERS
- OUTFALL SEWER LINES
- SEWAGE FORCE MAINS
- LOW PRESSURE WATER SUPPLY LINES



A-M

AMERICAN-MARIETTA COMPANY
CONCRETE PRODUCTS DIVISION

GENERAL OFFICES
AMERICAN-MARIETTA BUILDING, 101 EAST ONTARIO STREET, CHICAGO 11, ILLINOIS PHONE: WHITEHALL 4-5600

DIVISIONS AND SUBSIDIARIES

B. C. Concrete Company, Ltd.
Concrete Conduit Company
Concrete Products Co. of America
Lamar Pipe and Tile Company
Lewistown Pipe Company
Universal Concrete Pipe Co.

Now's the time to mail this month's Readers' Service card.

Verti-Line
PUMPS
were first—
are first

Virtually every major turbine pump improvement has been pioneered by the makers of Verti-Line Pumps. For instance:

first to produce a vertical pump for small diameter casing.

first to place the line shaft inside of the discharge pipe enclosed in a protective tube.

first to introduce line shaft lubrication from surface of ground.

first to introduce a full-floating ball thrust bearing head.

first to design high efficiency enclosed impellers.

first to introduce factory practices to insure proper shaft alignment.

first to introduce and pioneer the hollow-shaft motor head.

first to adopt the streamlined, weatherproof, built-in motor.

first to employ highly technical methods for statically and dynamically balancing rotating parts.

LAYNE & BOWLER will continue to be FIRST in presentation of improvements.

in all industry

on the farm

for the city

More than 100,000 satisfied vertical pump users agree there's no pump like Verti-Line for low first cost, economical operation, and negligible maintenance. Whatever your vertical pump needs may be, it will pay you to investigate Verti-Line before you buy.

Send for your free copy of our new booklet "Pumps For Sale." Ask for Bulletin U-75

Verti-Line Pumps are the exclusive products of
LAYNE & BOWLER PUMP COMPANY
general offices and main plant
2943 VAIL AVENUE • LOS ANGELES 22, CALIFORNIA

Need more facts about advertised products? Mail your Readers' Service card now.

flocs into tiny little ones that won't settle or imparts a terrific taste and odor to a water that is otherwise clear, cool and sparkling. Yes, the Gremlin was in the water long before he was in the air or elsewhere.

★ ★ ★

Swedefinition —Financial Wizard —"One who, with today's prices, can still live within his income."

★ ★ ★

Re Fluoridation — At the Purdue Industrial Waste Conference I presided at a session where Wally Sanderson (N. Y. Dept. of Health) told of contamination of ground waters by fluorides from an industrial waste. I mentioned that the topic was timely in view of Ben Nesin's comments at the Buffalo, N. Y., meeting of the N. Y. Section (see this column in the June issue of *Public Works*.)

Of course there were some questions at Purdue and as a reporter, I reviewed briefly what I reported in my column last month.

Dr. Jules Cass, of Kettering Laboratories was present and spoke on the subject. I had hoped to have the gist of his remarks available for this column but didn't receive them in time. It should be noted that the Kettering Laboratory is a disinterested organization of national reputation and that their findings apparently do not agree with Mr. Nesin's report.

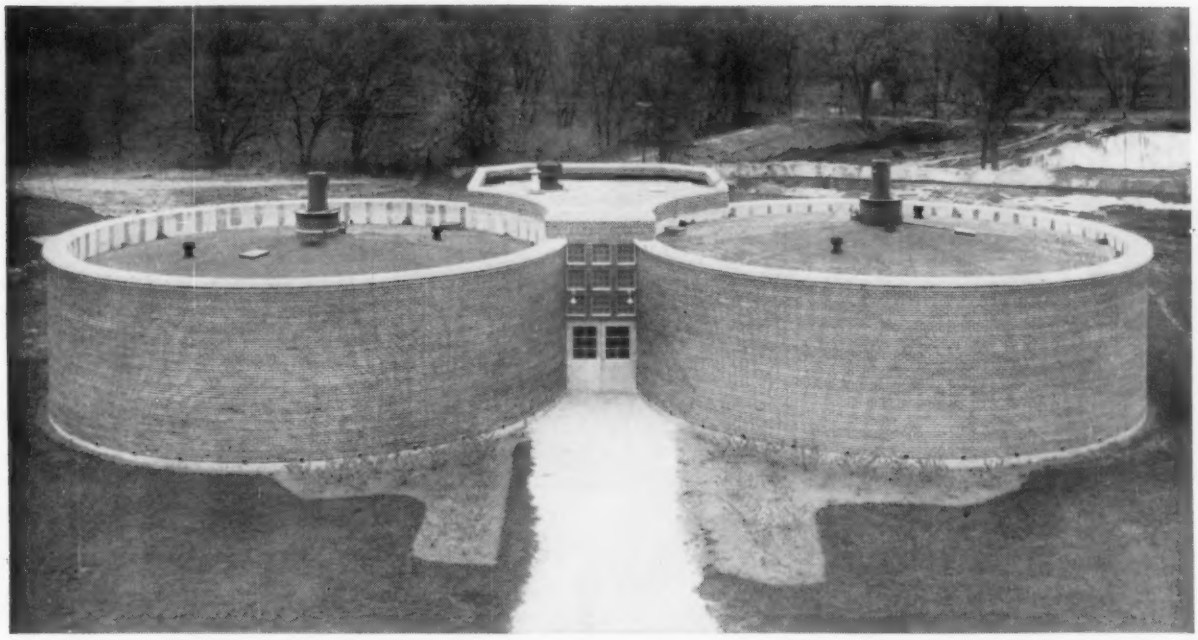
Next month I hope to have a statement from Dr. Cass. Meanwhile it is of interest to note this item in the April News Letter of The Virginia Sect. (AWWA)—"It is estimated that well over half of the population of Virginia is now getting fluoridated water and this percentage will increase shortly with the addition of Chatham, Bristol and Roanoke."

★ ★ ★

A Bit Late — This item should have appeared before, but it is better late than not at all—In the meeting notice of the West Shore (Lake Mich.) Water Producers Assn. for the April 20 meeting, George Prindle, Secretary wrote: "Program—After Walter Pierce, our host, has done the honors with his customary grace and skill, the meeting will be turned over to Miles Griffith (Racine), the Chairman for '54. Now Miles is a brilliant young engineer, but some of his ideas are a bit cockeyed, from our point of view. For instance, he feels that distribution plays an important part in the service which water de-

Now's the time to mail this month's Readers' Service card.

Rochester's two 50′ digesters, each equipped with PFT Floating Cover



At Rochester, Minnesota . . .

Modern sewage treatment for world's medical center

EXPANDABLE NEW PLANT INCLUDES PFT "CONTROLLED DIGESTION"

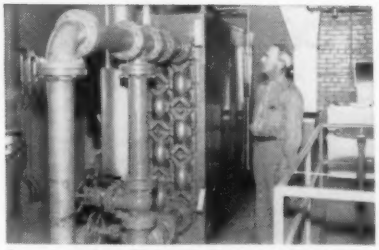
Looking far into the future, Rochester has built a trickling filter plant designed to grow with the city for the next 60 years! Completed in 1952, plans already call for additions that will handle 7 MGD by the year 2000 . . . nearly *twice* its present load. PFT equipment was installed in the plant for effective "controlled digestion."

A PFT Floating Cover is installed in each of the 50′ digesters for accelerated digestion and positive scum submergence. Operations are simplified because additions and withdrawals can be made at times best suited to the overall operation . . . no fixed levels need be maintained.

Breakdowns and repairs are materially reduced because Floating Covers contain no moving parts. Since no mechanical agitation is required, and heat is supplied from *external* heaters, all maintenance takes place outside the tank.

In the Control Room, a *PFT Heater & Heat Exchanger unit* (500,000 B.t.u. per hr.) maintains close temperature control of the digesters *automatically*. Fired by digester or city gas, it cuts fuel costs by utilizing all gas produced in the digesters. Effective "controlled digestion" is due in large part to this automatic heat control!

Congratulations to Rochester, medical center of the world, on its excellent new plant and its far-sighted planning.



Superintendent Walter C. Hogenson checks heat output of PFT Heater & Heat Exchanger unit in the digester control building.

Design of plant by / *Toltz, King & Day, Inc. St. Paul, Minnesota*

waste treatment equipment exclusively since 1893

P.F.T.

PACIFIC FLUSH TANK CO.
4241 Ravenswood Avenue
Chicago 13, Illinois

PORT CHESTER, N. Y. • SAN MATEO, CALIF. • CHARLOTTE, N. C. • JACKSONVILLE • DENVER

Get full details of this month's products . . . mail your Readers' Service card today.

Need more facts about advertised products? Mail your Readers' Service card now.

No. 5* of . . .

12 REASONS WHY
YOU SHOULD BUY AND USE
LOW-PRICED

HOMESTEAD
Lubricated PLUG VALVES
Pat. Pending

Homestead's exclusive completely controlled lubricant system positively prevents sticking by its instant, piston-like movement of the plug downward at the start of each lubrication. Spring and line pressure return it to stem-sealed position.

This is only **one reason why you should buy and use low-priced** HOMESTEAD LUBRICATED PLUG VALVES.

HERE ARE ALL TWELVE

1. Extra long valve life assured by very close tolerance between sealing surfaces.
2. Straight line fluid flow—streamlined ports—minimum resistance to flow—minimum pressure drop.
3. Triple head seal—two lubricant rings and reinforced Teflon stem seal prevent leakage.
4. Easy turning—plug floated on Teflon washer and reinforced Teflon ring.
5. Leak-proof double ball and lubricant sealed check valve. No springs. No maintenance.
6. Full-threaded screw prevents dirt being forced into lubricant system.
7. Quarter-turn fully opens or closes.
8. Reinforced Teflon stem seal—no cold flow—continuous, positive seal.
9. Seating surfaces protected in both open and closed positions.
10. High pressure lubricant system provides full lubricant seal around ports.
11. Self-freeing plug prevents sticking.
12. Two lubricants handle most services.

FOR CATALOG AND COMPLETE DETAILS MAIL COUPON TODAY

Without obligation, send Reference Book 39—Section 5 on HOMESTEAD LUBRICATED PLUG VALVES.

NAME _____ TITLE _____

COMPANY _____

ADDRESS _____

CITY _____ STATE _____

HOMESTEAD VALVE MANUFACTURING COMPANY
"Serving Since 1892"

P. O. BOX 40 CORAOPOLIS, PA.

Thousands use our Readers' Service card to keep up to date . . . do you?

partments render their communities.

"As for us, we feel that after we have performed the miracle of taking water which is polluted, turbid and stinkified, and processing it into a sparkling and delightful beverage, we should be through—after that the public should come and get it. However, Miles is Big Boss, and what he says goes. Therefore, we will spend the evening discussing the various and sundry problems concerned with pushing our finished product around the town to the points of consumption."

★ ★ ★

More on AWWA Convention Attendance — This is being written before the Chicago meeting so—I can't make any comments in comparison to the information which I quoted in my April column; I can however let you read a very interesting and enlightening letter from Carl Brown of U. S. Pipe & Fdry. Co. Carl who is a past president of the Wat. & Sew. Wks. Mfrs. Assn. wrote—

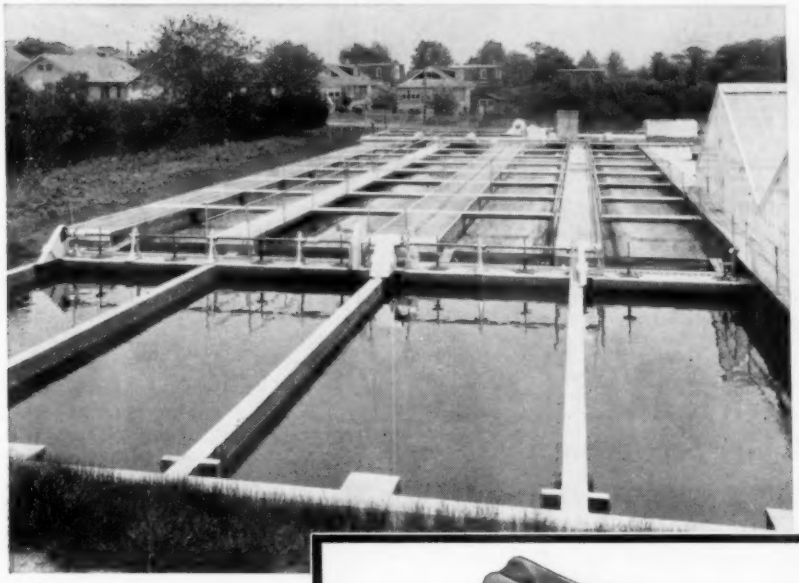
"I read your column in the April issue of Public Works magazine and you certainly hit upon a controversial subject when you brought up the attendance at AWWA National conventions. This is one that has been discussed backward and forward not only by water works officials but also by the manufacturers informally and formally at meetings of the Board of the Manufacturers Association.

"As you can well understand, the expense of conventions, not only National but Sectional, runs into a very high figure and some companies have expressed themselves as believing that too much money is spent on conventions as a whole. In so far as the Water Works Association is concerned, I personally do not feel that our expenses are excessive either for the National conventions or for the numerous Sectional conventions each year. All of these meetings afford our sales representatives an excellent opportunity of making and maintaining contacts that would be extremely difficult without the benefit of the meetings.

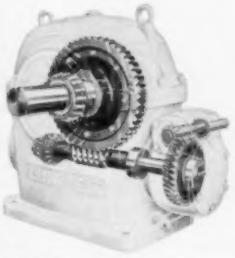
"Concerning your specific discussion with Wendell LaDue, I side with you because I believe that the exhibits at the National conventions are extremely important from the point of view of the manufacturers as well as the superintendents and engineers. Exhibits have been made an integral part of

(*Continued on Page* 142)

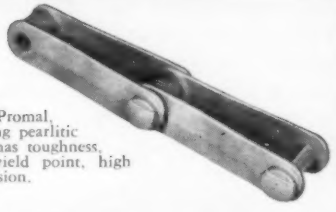
How will your judgment on SANITARY ENGINEERING EQUIPMENT look after 15 years?



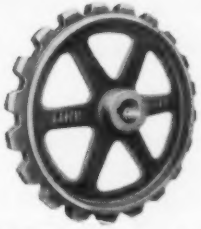
FOR 15 YEARS, the Link-Belt chain on final tank Straightline Collectors at this Collingswood (N.J.) activated sludge plant rendered dependable service, running 24 hours per day, *without replacement.* Straightline collectors in primary tanks have been in service for 24 years without replacement. Clearness of effluent may be judged by reflection of the drive machinery in final tanks in foreground.



ENCLOSED DRIVES. All types have sturdy gray iron housings, anti-friction bearings and precision gears for long trouble-free operation.



CHAIN. Made of Promal, the longer-wearing pearlitic malleable iron, has toughness, strength, high yield point, high resistance to abrasion.



SPROCKETS. Flint-Rim wheels have smooth, file hard, wear-resisting teeth, assuring maximum life.

LINK-BELT equipment is sturdily designed to last for decades

REMEMBER this when developing specifications and interpreting quotations on your water, sewage or industrial waste treatment system. It pays to give thoughtful analysis to design and equipment which will assure long life with little maintenance. Such scrutiny will also tell you why — in cities large and small . . . in plants of all types — Link-Belt installations continue to deliver top efficiency at lowest operating cost for many years.

Link-Belt offers you a broad line of *quality* sanitary equipment — including screens, collectors, mixers and complete conveying and power transmission equipment. In fact, Link-Belt pioneered such life-lengthening features as Flint-Rim sprockets and Promal chain.

With this wide choice of equipment, you also put Link-Belt's many years of technical experience to work on your needs. These two are your assurance of sturdy design . . . close attention to all construction details . . . a thoroughly tested, tried and proved system.

Next time you're faced with water, sewage or industrial waste treatment problems, call your nearest Link-Belt office. Our engineers will work with yours . . . with your chemists and consultants to provide you with the finest in modern treatment equipment.

LINK-BELT

SANITARY ENGINEERING EQUIPMENT

LINK-BELT COMPANY: Executive Offices, 307 N. Michigan Ave., Chicago 1. To Serve Industry There Are Link-Belt Plants and Sales Offices in All Principal Cities. Export Office, New York 7; Canada, Scarboro (Toronto 13); Australia, Marrickville, N.S.W.; South Africa, Springs. Representatives Throughout the World. 13,827

It's a fact . . . our handy Readers' Service card is the way to get new catalogs.

Mark-Rite Econo-Liner push type shown, available with spray tube or shields, paints lines from 2 to 6 inches wide.

IF YOU'RE THINKING OF BUYING A LINE MARKER

then you can profit by the experience of thousands of Mark-Rite users

- Look for the vertical paint tank, independent from air reservoir; we don't use the horizontal type even though it's cheaper, because the paint might back up into the compressor.
- A large quick-release tank opening is a must for rapid reloading and the whole tank must be removable for easy cleaning.
- Make sure you get ample compressor capacity. Mark-Rite units have a generous reserve of horsepower and air.
- Check the location of the gun; it should be at the pivot point to maintain line width on turns. Can it paint cross walks right up to the curb? Ours can.
- See that you get an automatic type gun (we use the best that is made by the largest manufacturer of road striping guns), and don't overlook the strainer.
- Size up your work load, we have the greatest selection, from small push types to large self-propelled sizes of road marking equipment, and can steer you rite.
- Mark-Rite liners will handle all types of road marking paint including reflective pre-mix or binders for drop-on beads. They can be connected quickly to standard spray gun for stencil work, fire hydrants, benches, etc.
- It all adds up to a greater economy in your entire road marking program. There are over 19,000 satisfied users to confirm it.
- Get in touch with your local supply house or write to the factory and ask for a demonstration.

Mark-Rite
ECONO-LINER

Universal Mfg. and Sales Co., 5211 Pacific Blvd., Huntington Park 2, Calif.
Factories in Los Angeles and Peoria • Factory distributor in Canada

Now's the time to mail this month's Readers' Service card.

SWEDEFINITIONS IN DUPLICATE

Your "Swedefinition" in the April issue was good, but it wasn't that good. I mean it surely didn't merit an encore.

T. F. McCarthy,
Berkeley, Calif.

Reply by "Doc" Symons: I quite agree with you that the "Swedefinition" in my April column was not good enough to merit an encore. Maybe the linotype man thought it was good because he added the encore—it did not appear twice in my original copy. I'm glad to know that someone reads the column closely enough to discover these errors.

Confession by the Editors: We did it, but unintentionally; we didn't catch the repeat in the galley proof nor in the final page proofs. Doc is not guilty.

JACK HINMAN MOVES AGAIN

In view of the interest you have taken in my peregrinations, I want to tell you that I am going to Guatemala City, Guatemala, on the 15th May to be a Public Health Engineering Consultant for the Pan American Sanitary Bureau for a period of three months. The work is in connection with an interesting Water Works Operators School. The students are to be 24 operators and supervisors from six countries in the Central American Area and Mexico. George O. Pierce, Chief, Environmental Sanitation Section, Pan American Sanitary Bureau, 1501 New Hampshire Avenue, NW., Washington 6, D. C., is in charge of arrangements.

I shall miss the meeting of the AWWA again. I have just cancelled my reservation at the hotel. When I get back, I expect to be available for other duty.

With best regards and best wishes, I am,

Jack J. Hinman Jr.
P. O. Box 389
Iowa City, Ia.

SITUATION WANTED

I can be of *reel* value to any Master Plumber who wants to complete more projects in less time. My personal appearance, proven abilities, and on-the-job experience offer you many unique advantages. I'm looking for a permanent connection; one where I can provide day-in, day-out service. Financial demands? Reasonable, and will more than be returned in dollar- and time-savings. Please contact me on your next visit to your wholesaler. I'm easy to identify—just ask for Wolverine's *Roll of Tube that Rolls!*

WOLVERINE TUBE, 1427 Central Avenue, Detroit 9, Michigan.

WOLVERINE TUBE
DIVISION OF CALUMET & HECLA, INC.
Manufacturers of Quality-Controlled Tubing and Extruded Aluminum Shapes

PLANTS IN DETROIT, MICHIGAN, AND DECATUR, ALABAMA.
SALES OFFICES IN PRINCIPAL CITIES.

Read how FITCHBURG CHIPPER SOLVES BRUSH DISPOSAL County of Bergen, N. J.

OFFICE OF SUPERVISOR OF ROADS
COUNTY OF BERGEN

70 ZABRISKIE STREET
HACKENSACK, N. J.

J. ERNEST THIER, SUPERVISOR
DIAMOND 2-1350

May 26, 1955

Mr. W. O. Forman, President,
Fitchburg Engineering Corp.,
Fitchburg, Massachusetts.

Dear Mr. Forman:

I thought I would take five minutes out to inform you about the efficient work your Fitchburg Chipper is doing in Bergen County.

As you probably well know, this Department maintains 450 miles of County road, much of it in the rural area, and formerly, when cutting brush, we had to use a large dump truck and three men to load it, and we were then faced with the problem of disposing of this brush, which was a job in itself.

Since purchasing the Fitchburg Chipper we only need one or two men and a pick-up truck to haul it, and we are not faced with the problem of disposing of this roadside brush, as the wood is now chipped along the roadside to form a soil-improving mulch.

Yours very truly,

J. E. Thier

Supervisor of Roads.

Free Booklet

Perhaps the savings in man hours and equipment mentioned by Mr. Thier in his letter may apply to your city, town or department.

For further information on how a Fitchburg Chipper can benefit your operation, send for FREE BOOKLET: ***Fitchburg Chippers—Real "Brush Eaters".*** Address Dept. PW-75

FITCHBURG ENGINEERING CORPORATION
FITCHBURG, MASSACHUSETTS

Get full details of this month's products . . . mail your Readers' Service card today.

DEAD-END FLUSH TANKS

I have called to the attention of our Omaha departments having to do with the safe water supply and sewage disposal that we must eliminate some 250 or 300 arrangements whereby the dead ends of sanitary sewers are flushed periodically by means of an automatic flush tank located in the man-hole. Such flush apparatus is supplied with city water through an inlet which can under certain conditions become submerged in sewage and thereby create a water pollution hazard.

There must be some safe uptodate method of flushing such sewers without creating such a hazard. I will appreciate it if there is anything you can do to enlighten me on the subject.

L. E. Christensen
Plumbing Inspector
Bldg. Dept.
Omaha, Nebr.

• • •

NEW DEPRECIATION METHODS FOR CONTRACTORS

This booklet contains a review of Section 167 of the Internal Revenue Code of 1954 covering new methods of depreciation allowances, which are of special importance to companies whose business is or allied with construction work. 11 pages. Copies free from Jaeger Machine Co., Columbus 16, Ohio.

INTERPRETATION OF ENGINEERING DATA

The data contained in this booklet, "Interpretation of Engineering Data: Some Observations"—the Edward Marburg Lecture—by Harold F. Dodge, was presented at the 1954 Annual Meeting of the American Society for Testing Materials. 36 pages. Copies from the American Society for Testing Materials, 1916 Race St., Philadelphia 3, Pa., at $1.50 each.

PARKING REQUIREMENTS IN ZONING ORDINANCES

This bulletin brings the factual material of zoning for parking requirements up to date as of August, 1954, a 1950 study having been published in bulletin 24. The present study contains consolidated summaries of all of the zoning provisions by the major types of uses involved in measuring the parking space in 311 municipalities. 28 tables. Price is 75¢. Request Bulletin 99 from Highway Research Board, 2101 Constitution, Washington 25, D. C.

How Oliver Iron Age mist sprayer stretches work force in busy summer months

Spraying demands crop up heaviest during warm months when tree pests, flies and mosquitoes are most prevalent. At the same time, work demands are usually heaviest on park and maintenance crews.

That's why so many cities and towns are turning to the speed, efficiency and cost savings of the Oliver Iron Age 125 mist sprayer. For this two-man unit gets around fast—uses less spray and does two to three times more work than old fashioned, three-man hydraulic rigs. And the mist sprayer gives complete control of tree pests, flies and mosquitoes.

The 125 sprayer will reach the highest shade trees with a fine, long-lasting mist that covers every leaf and limb. There's no drip from trees to arouse property and car owners. And both wettable powders and emulsified liquids may be used. Sprayer controls are easy to operate, and the turret rotates 360° for full control of the air blast.

For applying insecticides in those hard-to-get-at spots, the 125 mist sprayer can be used with hose and gun assembly. See your Oliver Distributor. Find out how you can get more done, faster at lower cost with the Oliver Iron Age 125 mist sprayer. Ask, too, about Oliver's complete line of wheel and crawler tractors.

A separate gun and hose assembly may be attached to the pump motor of the 125 mist sprayer. Perfect for spraying inaccessible spots.

THE OLIVER CORPORATION

400 West Madison Street, Chicago 6, Illinois

OLIVER IRON AGE

Thousands use our Readers' Service card to keep up to date . . . do you?

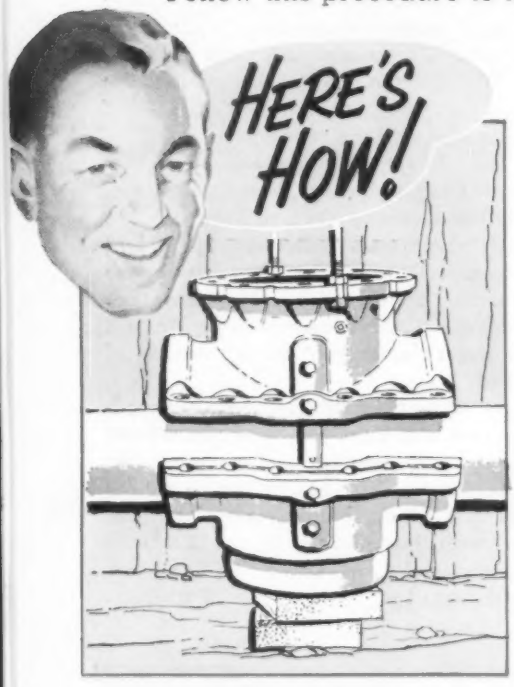
ELIMINATE SERVICE INTERRUPTIONS

INSTALL CONTROL VALVES WITHOUT SHUTDOWN!

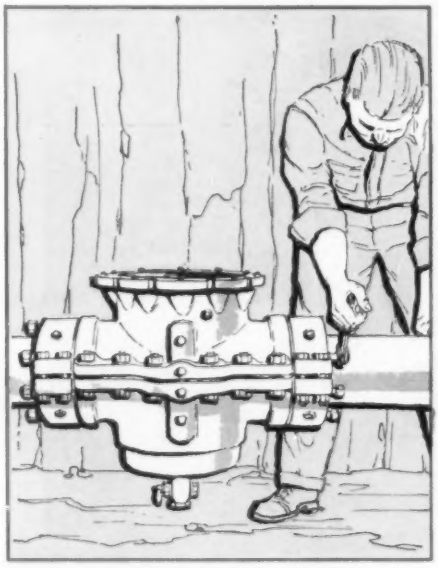
Now you can install control valves without shutting down even a small part of your city's water system. Inconvenience to customers and danger of fire is completely avoided by using Mueller Inserting Valves.

Mueller Inserting Valves may be installed in any existing line under pressure and, once installed, are operated like standard gate valves. In fact, the mechanism of Mueller Inserting Valves is identical to that of Mueller AWWA Gate Valves and repair parts are interchangeable.

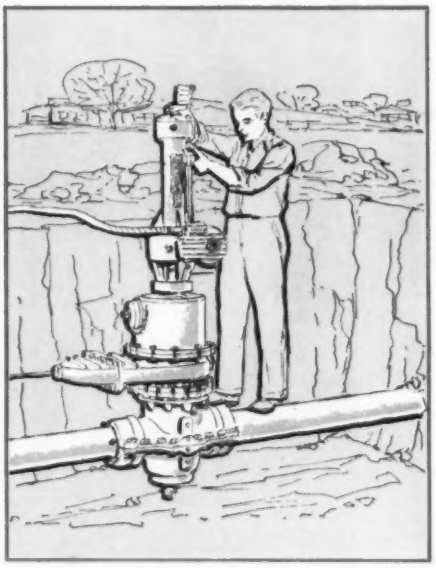
Follow this procedure to install . . .



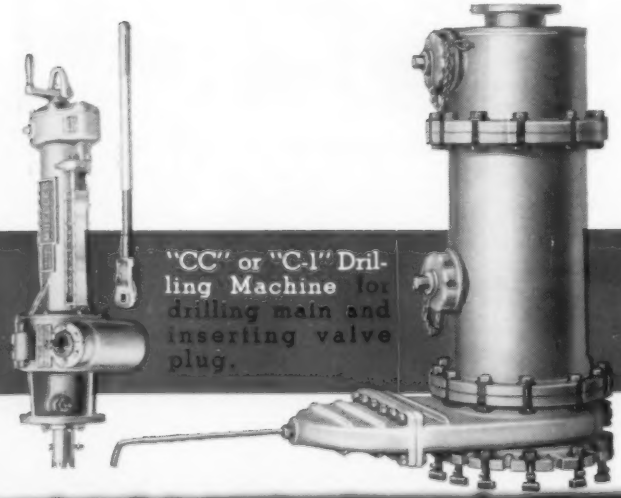
STEP 1. BOLT SLEEVE TO MAIN.
Main is cleaned and sleeve halves are bolted together around main.



STEP 2. PREPARE SLEEVE.
Sleeve is calked and leaded to main in desired position and slide valve is attached.

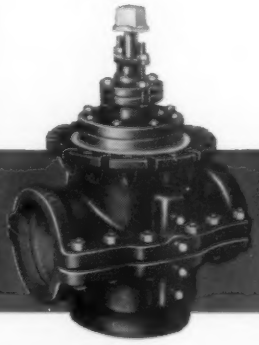


STEP 3. MAKE CUT.
Section of main inside of sleeve is removed with Mueller "CC" or "C-1" Drilling Machine.



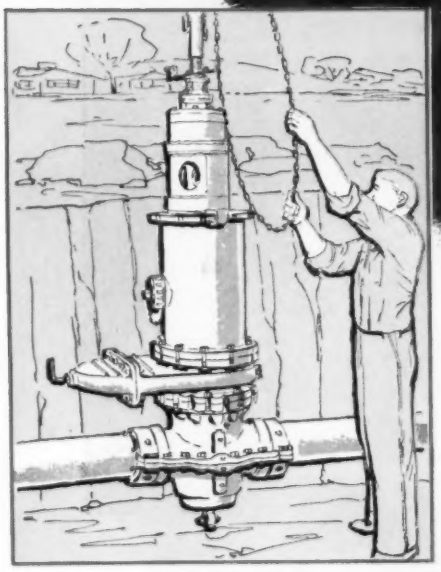
"CC" or "C-1" Drilling Machine for drilling main and inserting valve plug.

H-810 Basic Inserting Equipment permits insertion under pressure of all sizes of inserting valves.

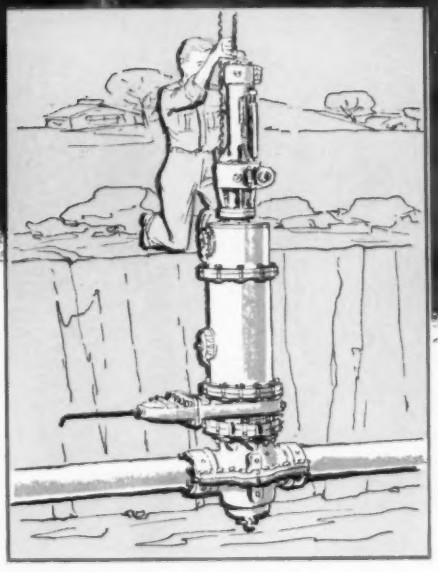


H-800 Inserting Valve
Sizes 4", 6", 8".
Shipment from stock.

AND FIRE HAZARDS!



STEP 4. PREPARE VALVE PLUG.
Long adapter is bolted to slide valve and valve plug is readied for insertion into main.



STEP 5. INSERT VALVE PLUG.
"C-1" machine is fastened to valve plug to lower plug into place under pressure.

STEP 6. COMPLETE INSTALLATION.
Packing screws are tightened and lead is poured into top joint to seal valve plug in place.

Control Valves at vital points permit:

- Installation or repair of fire hydrants
- Isolation of small sections
- Extension of mains
- Modification of system . . . without extensive shutdown

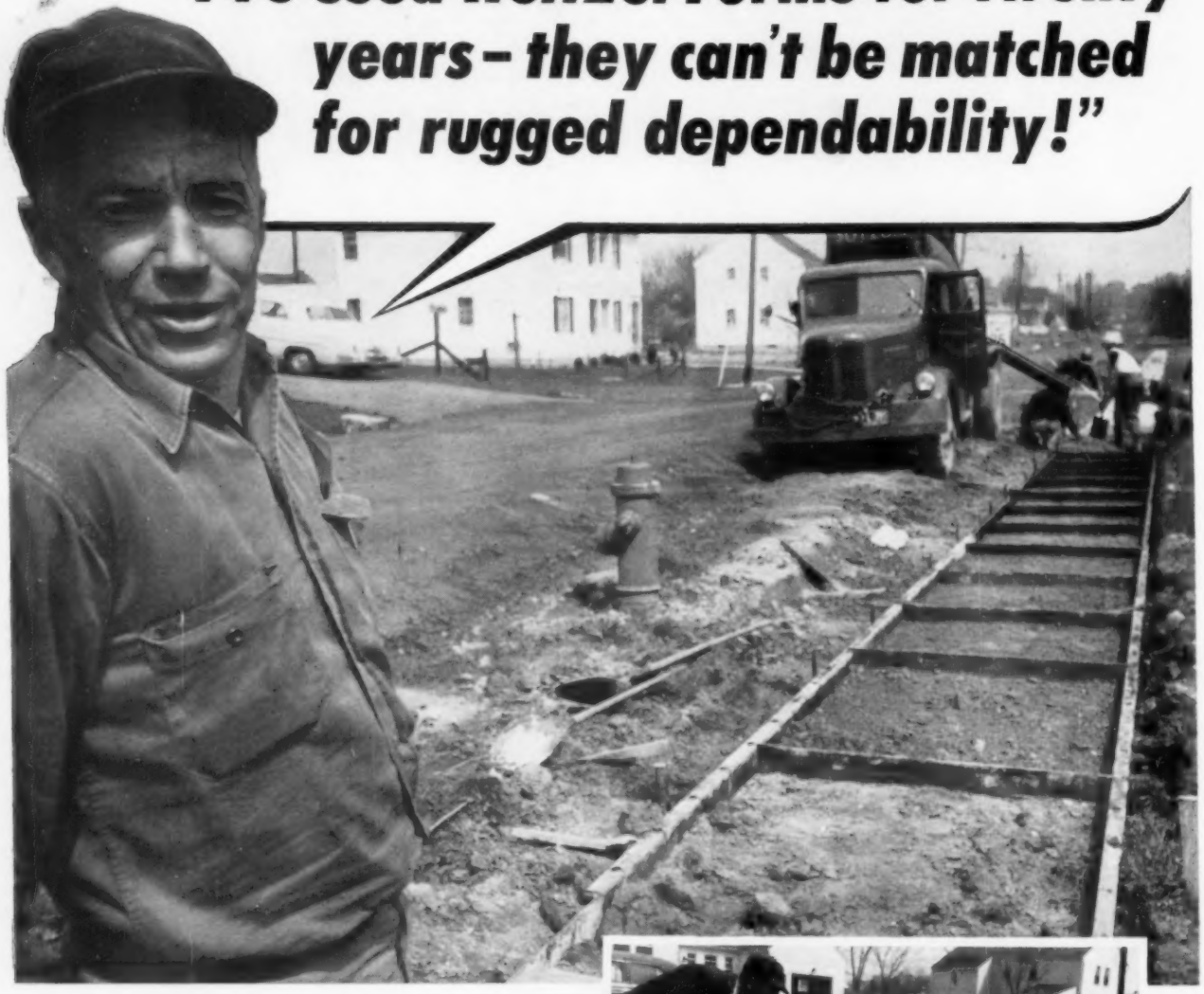
Call your Mueller Representative or write for Catalog H-20 for complete information.

MUELLER CO. DECATUR, ILL.

Dependable since 1857

FACTORIES & OFFICES AT DECATUR · CHATTANOOGA · LOS ANGELES · SARNIA, ONTARIO

"I've used Heltzel Forms for twenty years – they can't be matched for rugged dependability!"



"Heltzel Steel Forms—both sidewalk and curb and gutter—are all they're reputed to be," states E. W. McShaffery, Ohio contractor. "They're quick setting, easy to align and they strip like they're supposed to. What's more they're built to last. I've used other makes, but none deliver the year-in, year-out service I get from Heltzel Forms."

There are hundreds of contractors like Mr. McShaffery who, through experience, know you can't beat Heltzel Steel Forms when it comes to service, dependability and extra long wear.

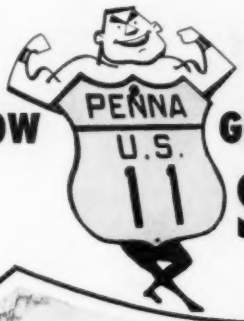
Make your next forms Heltzel, and you, too, will understand why more and more of America's leading contractors specify Heltzel all along the line.

Heltzel builds a complete line of sidewalk, curb, curb and gutter, highway, airport, foundation and special steel forms.

THE HELTZEL STEEL FORM & IRON COMPANY

42000 Thomas Rd., WARREN, OHIO

Need more facts about advertised products? Mail your Readers' Service card now.



HOW PENNA GOT A PAIR OF HARD SHOULDERS WITH STERLING ROCK SALT

In 100-lb. bags or in bulk

STERLING ROCK SALT STABILIZATION

quick . . . economical . . . less maintenance

Sterling Rock Salt stabilization produces safe, all-weather shoulders that have high density, reduced frost heave, reduced loss of material, and reduced dust. Their initial and maintenance costs are low. These shoulders may be constructed with equipment which is usually readily available.

To place an order, or for more information about soil stabilization, communicate with International Salt's nearest sales office.

INTERNATIONAL SALT COMPANY INC.
Scranton 2, Pennsylvania

SALES OFFICES: Atlanta, Ga. • Chicago, Ill. • New Orleans, La. • Baltimore, Md. • Boston, Mass. • Detroit, Mich. • St. Louis, Mo. Newark, N. J. • Buffalo, N. Y. • New York, N. Y. • Cincinnati, O. • Cleveland, O. • Philadelphia, Pa. • Pittsburgh, Pa. • Richmond, Va.
ENGINEERING OFFICES: Atlanta, Ga. • Chicago, Ill. • Buffalo, N. Y.

Get full details of this month's products . . . mail your Readers' Service card today.

"This time... it's Mobil-Sweeper

We're buying on PERFORMANCE!"

MOBIL-SWEEPER DELIVERS THE PERFORMANCE YOU PAY FOR!

Why be satisfied with less — Communities all across the Nation, and even in foreign countries, select MOBIL-SWEEPER on these 6 Big Points —

- UNSURPASSED SWEEPING ABILITY
- GREATER MOBILITY
- PROVEN MANEUVERABILITY
- LOWEST MAINTENANCE COST
- UNEQUALED SAFETY
- PROVEN ECONOMY OF OPERATION

When budgets are tight, it's all the more important that you get the street-sweeping performance you pay for. Our large dealer organization in major cities throughout the United States and Canada stands ready to show you how MOBIL-SWEEPER does a better job day in and day out at lower cost. Write for the name of your nearest dealer.

THE CONVEYOR CO. 3260 E. Slauson Ave., Los Angeles 58, Calif.
Gentlemen: Please send catalog, with complete details and specifications for the Mobil-Sweeper.

NAME_____
TITLE_____
ADDRESS_____
COUNTY_____
CITY_____
STATE_____ PW-7

CONVEYCO
MOBIL-SWEEPER
DIVISION OF THE CONVEYOR CO. • 3260 E. Slauson Avenue, Los Angeles 58, California

Thousands use our Readers' Service card to keep up to date . . . do you?

To order these helpful booklets check the coupon on page 33.

Get full details of this month's products . . . mail your Readers' Service card today.

FREE EQUIPMENT DATA to Help Your PUBLIC WORKS PROGRAM

NEW LISTINGS

The engineering information in these helpful catalogs will aid you in your Engineering and Public Works programs. Just circle numbers you want on the coupon, sign and mail. This free Readers' Service is restricted to those actively engaged in the public works field.

Standardized Process Control Instruments

203. Meters, regulators, indicators and pneumatic recorders and controllers are described in a 24-page catalog available from the Fischer & Porter Company, Hatboro, Penna. Complete specifications including dimensions, prices, capacities and construction materials are included. Check the coupon for your copy.

Stop Slippery Conditions On Open Grid Bridge Floors

208. Reliance Steel Products Company, Walnut St., McKeesport, Pa., has published a four-page folder on the "Safe-Grip" surfacing machine, which mills a gripping surface on existing bridge floors. The machine is self-propelled and allows one-way traffic while in use. The folder can be had by checking the coupon.

Badges for All Public Departments and Agencies

209. An excellent catalog which covers all types and sizes of badges for public departments and civilian agencies. For full particulars send for "Our Diamond Jubilee Catalog" by the C. G. Braxmar Co., Inc., 216 East 45th St., New York 17, N. Y., or check the coupon.

Convenient Ready-to-Use Grout and Mortar

210. Two bulletins describing the use and advantages of pre-mixed grout and mortar are now available from the Master Builders Company, Cleveland 3, Ohio, or by checking the coupon.

MORE LISTINGS ON PAGES 34 TO 48

The Benefits You Should Know About Plastic Pipe

213. A catalog designed to help you select the plastic pipe best suited to your purpose is now available from the Continental Can Company, Millsplastic Pipe Division, 100 East 42nd St., New York 17, N. Y. Sizes, types, advantages, and chemical reactions on the plastic pipe are included. Check coupon for your copy.

A Rugged, Simple to Operate Sprayer

219. Information is available on the Tarco "direct from the shipping drum" sprayer from the Tarrant Manufacturing Co., Saratoga Springs, N. Y. Warm and cold patching, weed spraying, waterproofing and painting are some of the operations described in this bulletin. Check coupon for your copy.

The Amount of Dead Weight Concrete Reduced

244. Information on Sonovoid fibre tubes can be had from Sonoco Products Company, Construction Products Division, Hartsville, S. C. The advantages of using these tubes and where it is practical to use them are explained fully. Design tables, prices and nearest source of supply are included. Check the coupon.

A Roller Engineered for High Performance on Low Budgets

254. Bulletin S-68-555 on Buffalo-Springfield's standard tandem roller with torque converter drive has just been released. Describes the operation of the new drive with money-saving features that give low-cost rolling and high-speed operation. Send to Buffalo-Springfield Roller Company, Springfield, O., for your bulletin or check the handy coupon.

A Silica Activator for Water and Waste Purification

269. The Omega Machine Co. has published a color bulletin on the Model 63 Activator which is used in the continuous preparation and feeding of activated silica, a valuable coagulant aid. Write to Omega Machine Co., 345 Harris Ave., Providence, R. I., for Bulletin 63-MI or check the coupon.

Digester Capacity Requirements Are Substantially Reduced

284. A 16-page, two-color bulletin. "The Dorrco Densludge Digestion System" is now available from the Dorr-Oliver, Inc., Barry Place, Stamford, Conn. Describes the development, equipment, operation, typical applications and design loadings of this new sludge digestion system. Explains how digester capacity requirements are substantially reduced. Included are wash and line drawings and photographs of the various equipment units. Check the coupon.

Helpful Data on Sluice Gates

286. In a well-organized 170-page catalog you will find complete engineering and design data on Pekrul sluice gates, headgates, automatic flap gates, lifts and accessories. Pertinent data on models and sizes for virtually every application will be found in this publication. This catalog, PK 55, can be had by applicant writing on business letterhead to Pekrul Gate Div., Morse Bros. Machinery Co., Denver 1, Colo.

Modern Maps From Modern Methods

353. Full details on aerial maps and aerial photography are furnished in attractive booklet by Michael Baker, Jr., Air Maps, Inc., 115 Shields Street, Rochester, Pa. Advantages of aerial photography and the needs of topographic maps are included. Check the coupon for your copy.

Valuable Information On Prestressed Concrete Tanks

356. This helpful booklet describes the design, uses and advantages of prestressed concrete in all types of storage tanks. Plenty of charts, diagrams and illustrations are included. Get yours from Preload Enterprises, Inc., 211 East 37th St., New York 16, N. Y., or check the coupon.

Instrumentation and Control For Water Treatment Plants

370. Helpful data on the instruments and control units used for every step of water filtration plant operation are made available to designing engineers by Builders-Providence, Inc., 345 Harris Ave., Providence 1, R. I. Dozens of line drawings and descriptive text cover the Venturi meter, instruments for metering and controlling flow, liquid level, pressure and weight and chlorine gas feeders. Get 16-page Application Bulletin 100-K2A by checking the coupon.

Drill Concrete With Your Ordinary Electric Drill

376. Substantial cost-per-hole savings are shown with Tilden Rotary Konkrete Kore Drills, which penetrate reinforced concrete up to 6" per minute. Standard drills available in sizes 3/16" to 6". Larger sizes on order. Free sharpening service continued. Full data from Tilden Tool Mfg. Company, 209 Los Molinos, San Clemente, California, or check the coupon.

Methods and Equipment Used to Clean Clogged Pipe

394. Typical methods and equipment used in cleaning clogged water mains and industrial pipe lines are described in a new Bulletin available from the Flexible Pipe Cleaning Co., P. O. Box 167, Los Nietos, Calif. Photographs show the different methods of cleaning pipes. A chart of flow factors also is included. Check the coupon for your copy.

7-55

USE THIS COUPON to get detailed information on products and materials mentioned in this issue. Circle numbers below and mail today.

STOP READ AND SEND

Booklets from pages 33 to 48:

20 22 29 31 33 35 37 40 43 44
49 52 54 56 61 66 69 70 71 75
76 86 88 94 96 100 105 109 115 117
119 132 135 137 143 147 149 153 155 162
163 167 186 190 192 194 202 203 204 207
208 209 210 211 213 219 228 239 243 244
247 250 254 263 269 273 275 277 278 281
284 286 287 291 297 299 300 304 305 306
309 312 315 316 317 322 324 326 327 328
330 335 338 341 342 346 351 352 353 354
356 357 359 361 363 367 370 375 376 382
386 391 393 394 398 399 401 405 416 417
422 425 428

New Products, pages 146 to 151:

7-1 7-2 7-3 7-4 7-5 7-6 7-7
7-8 7-9 7-10 7-11 7-12 7-13 7-14
7-15 7-16 7-17 7-18 7-19 7-20 7-21
7-22 7-23 7-24 7-25

Name .....

Occupation .....

Street .....

City ..... State .....

NOT GOOD AFTER AUGUST 15, 1955 MAIL THIS CARD NOW

NEW LISTINGS (cont.)

Valuable Booklet on Series Streetlighting Systems

306. This booklet discusses the operating characteristics of mercury lamps on series street lighting systems and analyzer requirements for auxiliary equipment. Wiring diagrams and photographs to illustrate the principal equipment required for series operation are furnished. Booklet B-6513 is available from Westinghouse Electric Corporation, Lighting Division, Edgewater Park, Cleveland, Ohio, or by checking the coupon.

Engineering Data on Pneumatic Ejectors

327. Advantages of the new shone ejectors with details on receivers, check valves, pilot valve, cover, pipe connections, installation and important operation and maintenance features are fully described in bulletin 4005. Write Yeomans Brothers Company, 1999 North Ruby St., Melrose Park, Illinois, or check coupon for your bulletin.

A Pressure Proven Joint for Concrete Pipe

335. Investigate the Amseal Joint on low pressure concrete pipe for intercepting sewers, inverted syphons, sewage force mains and low pressure water supply lines. This folder is published by American-Marietta Company, Concrete Products Division, 101 East Ontario St., Chicago 11, Illinois. Describes concrete pipe for use in sewer and water lines where maximum operating pressure will not exceed 50 psi. Check the coupon today.

A Highly Active and Potentially Useful Algicide

354. Tests of Dichlone, the active ingredient of Phygon-xl, shows it to be a most effective chemical for killing blue-green algae in lakes and ponds. A report on the results of these tests and usage and availability of this algicide can be furnished by Naugatuck Chemical Div., Bethany 15, Conn., or by checking the coupon.

Portable Melting Furnace For Rubberized Joint Sealers

357. The Hauck double jacketed melting furnace uses L-P gas as fuel and a high flash point oil for heat transfer to assure close temperature control when melting rubberized joint sealers of all types. All details on this 16-gallon capacity unit are furnished in Bulletin 1081. Check coupon for your copy. Hauck Mfg. Co., 124 10th St., Brooklyn 15, N. Y.

Shredders and Grinders For Efficient Sewage Treatment

346. Latest data on screenings shredder, garbage grinder and dry sludge shredder are presented in Bulletin SG10 by Gruendler Crusher & Pulverizer Co., 2915 North Market St., St. Louis 6, Mo. Dimension and capacity charts are provided, together with drawings and photographs of the grinders and screens. Check the coupon.

For Prompt Service Use The Coupon

"Poly-Cide" Removes Odors From Refuse Collection Equipment

338. Information on "Poly-Cide" formulations which will remove residual odors from refuse collection equipment with a simple rinse or spray is available from Brooks Chemicals, Inc., 3304 East 87th St., Cleveland, Ohio. Get full data by checking the coupon.

Construction Methods for Salt Stabilized Roads

367. A comprehensive booklet showing modern methods of salt stabilization is available from the Morton Salt Co., 120 So. LaSalle St., Chicago 3, Ill. Stabilized secondary roads, base courses and shoulders are discussed and all equipment and construction methods are covered. Just check the coupon for your copy.

WATER WORKS

Water Level Controls for Sewage and Water Plants

31. Dependable float-operated pump and motorized valve controls for single or multiple pump installations are described in bulletins issued by the Water Level Controls Div., Healy-Ruff Co., 719 Hampden Ave., St. Paul 4, Minn. All units feature splash proof construction, mercury tube switches.

Data on Cutting-In Valves, Repair Sleeves and Accessories

33. A variety of Clow products for installation and repair of cast iron pipe lines, including the Eddy cutting-in valve and sleeve, split sleeves for pipe repair, test plugs, valve boxes, Strickler pipe cutters and other fittings and accessories are featured in literature available from James B. Clow & Sons, Inc., Box 6600-A, Chicago 80, Ill. Check the coupon.

Meters and Instruments For Water Works

43. An attractively arranged 20-page booklet issued by Sparling Meter Co., Box 3277, Los Angeles 54, Calif., furnishes concise data on the full line of Sparling meters, indicator-totalizer-recorder instruments and other special instruments and controls. Check the coupon for your copy, or write for Bulletin 314.

Helpful Data on Water Works Products

49. A completely new catalog covering the entire line of water distribution and service products offered by the Mueller Company, of Decatur Ill., is now available to engineers and water works superintendents. The 328-page catalog features an easy-to-use sectional indexing arrangement to facilitate quick reference to any of the hundreds of products listed. A large section of useful engineering information is included Check the coupon today.

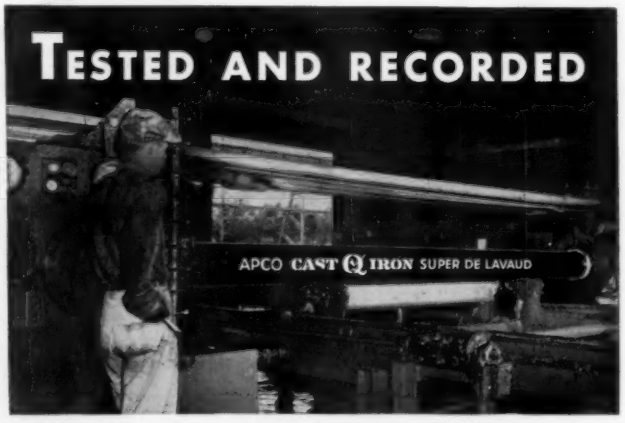
drill reinforced concrete
with
TILDEN
ROTARY KONKRETE KORE DRILLS
up to 6 inches of concrete per minute
U. S. Pat. No. Re. 23539
Patented core slot expels cuttings automatically

Get maximum drilling at minimum cost with Tilden's Konkrete Kore Drills. Cut 5 to 7 times more holes than ordinary drills. Drill clean, straight, ready-to-use holes at speeds up to 6 inches a minute—even through steel-reinforced concrete. Can be used with ordinary electric or rotary air motors—interchangeable shanks available. Free factory resharpening continued on sizes from 3/16" thru 6" diameter.

NEW! HAMMERCORE BITS!

Now—double the capacity of your electric hammer—cut drilling time in half even in hardest masonry. Can be used from ladders and scaffolds with minimum pressure. Sizes ¼" thru 1½". Write for details and prices.

TILDEN TOOL Mfg. Company
209 Los Molinos • San Clemente, Calif.
Stocked at Leading Supply Houses Everywhere



Each length of pipe we manufacture passes through the above hydrostatic test press where it is filled with water and the pressure raised to 500 pounds per square inch. The most common water works pipe is designed for an operating pressure of 150 pounds per square inch. This undergoes the 500 pounds per square inch hydrostatic test and permanent records for each piece of pipe are kept on file for inspection by our customers at all times. You can be assured with Alabama's Super De Lavaud Cast Iron Pipe. In sizes of 3" to 24" in modern long lengths. Bell and Spigot, Mechanical Joint and Flanged Pipe.

General Sales Offices
ANNISTON, ALABAMA
We Invite Inquiries to Our Nearest Sales Office
120 S. Michigan Ave. Chicago, Illinois
350 Fifth Avenue New York 1, New York

ALABAMA PIPE COMPANY
ANNISTON ALABAMA

NOT GOOD AFTER AUGUST 15, 1951 MAIL THIS CARD NOW

Water is vital...

Badger meters conserve it better!

IN only one year, more than *26-million tons of paper* are required to fill the needs of the nation . . . to help business operate, to serve personal needs, to bring your daily newspaper to your door. Yet it takes *more water than wood* to produce this paper.

The Badger water meters used in America help save water for this vital need . . . measure water accurately for homes and industry . . . provide a precise check of water usage and waste. And they make certain that users pay fairly for the water consumed . . . help make water departments self-supporting.

As a result of their superior performance through the years, Badger meters are the favorites of waterworks men everywhere... famous as the meters that save water, work and money.

Badger Water Meters

Badger Meter Mfg. Co.
Milwaukee 45, Wisconsin

"Measuring the water of the world for 50 years"

Efficient Coagulation With Ferri-Floc

69. Advantages claimed for Ferri-Floc as a coagulant include wide pH range, quick floc formation, manganese removal, control of certain tastes and odors, plus other aids in high quality water production. Check coupon for complete Ferri-Floc data. Tennessee Corp., Grant Bldg., Atlanta, Ga.

96 Page Book Helps Solve Water Problems

71. pH and Chlorine Control. A discussion of pH control and description of comparators, colorimeters and similar devices. A 96 page booklet. W. A. Taylor Co., 7304 York Road, Baltimore 4, Md.

Convenient Reference Manual Covers Cast Iron Pipe, Valves and Hydrants

76. An 80-page manual, issued by R. D. Wood Co. Independence Sq., Philadelphia 5, Pa., presents specifications for "Sand-Spun" cast iron pipe and fittings, outlines types of joints available, lists dimensions and weights in convenient tables and includes, in addition, full engineering data on the Mathews fire hydrant and R. D. Wood gate valves. Check the coupon for this useful information.

What You Should Know About Pipe Detectors

94. A new, up-to-date operating manual for pipe detecting instruments has been made available by the Detectron Corp., 5528 Vineland Ave., No. Hollywood, Calif. Although written chiefly for the Detectron Model 505, it contains operating hints and other information useful with any make pipe detector. To get a copy just check the coupon.

Useful Data on Butterfly Valves

100. Complete descriptions and tables of dimensions on the full line of Rockwell Butterfly Valves are contained in several bulletins published by the company. Construction details and special control features are illustrated. Write W. S. Rockwell Co., Eliot Street, Fairfield Conn.

Handbook of Cast Iron Pipes and Fittings

52. Full engineering data on products of the Alabama Pipe Co., including Super De-Lavaud cast iron pressure pipe and pipe fittings, valve boxes and other municipal castings are provided in Pressure Pipe Catalog No. 54, a 196-page publication of Alabama Pipe Co., Anniston, Ala. Weights, dimensions and specifications are clearly indicated in this easy to use reference. Requests for this valuable publication should be accompanied by your business letterhead.

Dependable Source For All Chlorine Products

66. Get latest data on Jones chlorine service for liquid chlorine, calcium hypochlorite and sodium hypochlorite packaged in lots best suited for your needs. Five strategic locations serve all parts of the country. Check the coupon or write John Wiley Jones Co., Caledonia, N. Y.

Rapid Sand and Pressure Filter Data

109. Rapid sand filters. A complete line of vertical and horizontal pressure filters, wooden gravity filters, and filter tables and other equipment. For engineering data, write Roberts Filter Manufacturing Co., 640 Columbia Ave., Darby, Pa.

Purification of Swimming Pool Waters

153. An up-to-date 64-page manual on purification of swimming pool waters presents a comprehensive discussion of daily requirements, chlorine residuals and feeding methods for hypochlorites and HTH tablets. Available from Industrial Chemicals Div., Olin Mathieson Chemical Corp., Baltimore 3, Md. by checking the coupon.

What You Should Know About Steel Reservoirs and Standpipes

163. In a handsome 24-page booklet "Horton Steel Reservoirs and Standpipes," the Chicago Bridge & Iron Co., Chicago 4, Ill., shows installations from 50,000-gal. to 10,000,000-gal. capacity with several types of roof and special architectural features. Engineering data includes information on capacities, foundations and improved surface protection. Check the coupon to get your copy.

What You Should Know About Turbine Pumps

167. In a colorful bulletin titled "Water Where You Want It . . . When You Want It" the Johnston Pump Co., Bin "K", Pasadena 8, Calif., gives details on turbine pumps with semi-open or closed impellers; oil or water lubrication; and adaptations for any power source or combination thereof. Get your copy of Bulletin 1015 by checking the coupon.

Locate Mains, Services and Leaks Without Digging

186. An 8-page booklet tells how to use the Fisher "M-Scope" to locate buried pipes, cables, valves, manhole covers, conductive and non-conductive sewer pipes and septic tanks by electronic means. Dry battery operated. Only one man is needed for operation. Get data from Fisher Research Laboratory, Inc., 1961 University Ave., Palo Alto, Calif., by checking the coupon.

Installation Guide for Transite Pressure Pipe

192. An convenient, pocket-size book of 115 pages covers the whole job from receiving and handling pipe to pressure and leakage tests of finished lines. Over 10 drawings show important operations, and the text tells both how and why. Copies are available from Johns-Manville, Dept. PW, 22 E. 40th St., New York 16, N. Y.

Complete Catalog and Reference Data on Valves and Fittings

211. The entire M & H line of valves, fittings and accessories for water works, filtration sewage disposal and fire protection are illustrated and fully detailed in Catalog 52 issued by M & H Valve & Fittings Co., Anniston, Ala. In addition to complete data on these products, there are many pages devoted to helpful engineering data. Every designer should have a copy. Get yours by checking the coupon.

DEPENDABLE ENGINES • ENTERPRISE

STATIONARY & MARINE

HEAVY DUTY POWER

Diesel • Dual Fuel • Tri-Fuel • Spark Ignited Gas

Units from 73 to 6933 HP
48 to 5007 KW

Over a million horsepower at work the world over!

ENTERPRISE
dependable **ENGINES**

San Francisco, California

Sales and Service in Principal Cities

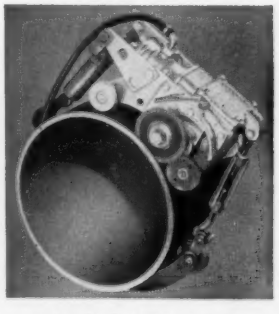
DEPENDABLE ENGINES • ENTERPRISE

Jein

PORTABLE AUTOMATIC PIPE CUTTERS

with Pneumatic or Electric Drive

for Cast Iron and Steel Pipe from 6" to 60" diameter



- Weight: only 145 lbs.
- Clearance: 12" max. around pipe.
- Set up time: 5-10 min. by 1 or 2 unskilled men.
- Machines operate under water.
- Cuts 8" pipe in 5 min.—24" in 18 min.
- Also available: "V" cutter for welded steel pipe.

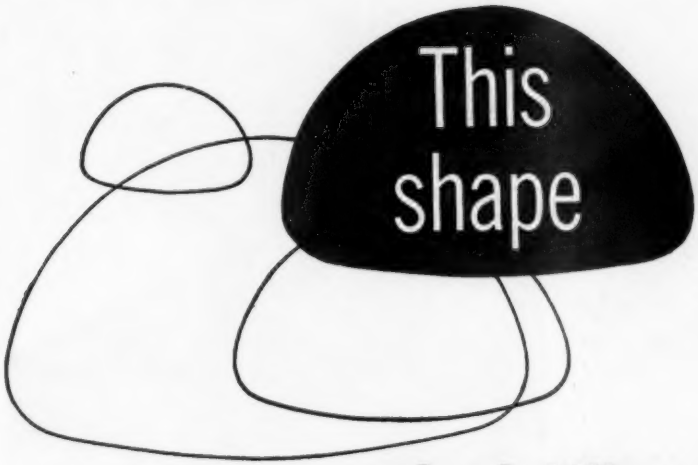
AMAZINGLY LOW COST

SIX MONTHS GUARANTEE

Write DRAWER A

PRESCOTT TOOL CO., INC.

BOX 7 — GREENDALE BRANCH — WORCESTER 6, MASS.
TELEPHONE TEmple 5-4431



solved Milwaukee's sewer problem

The problem was to enclose an open storm sewer, yet retain adequate waterway under the limited headroom available. A single round pipe of the right capacity would not fit the headroom, and a multiple installation of smaller pipe would add to expense.

The solution was Armco Pipe-Arch, a single structure that met both the water capacity and headroom requirements.

There's a size and type of Armco Corrugated Metal Drainage Structure for almost every municipal sewer need. Standard Corrugated Metal Pipe and Pipe-Arch meet normal service conditions. Where severe corrosion is a factor, you can specify Armco ASBESTOS-BONDED. It withstands acidic as well as alkaline wastes. Armco PAVED-INVERT will guard against erosive flow.

For larger sewers, there is Armco MULTI-PLATE Pipe and Pipe-Arch. All of these durable Armco Structures have the flexible strength of corrugated metal design—your protection against cracking or breaking under load. And there's no problem of malalignment or joint separation.

Write us for details or help with your specific sewer and drainage projects. We'll be glad to supply the data you need without obligation. Armco Drainage & Metal Products, Inc., 3575 Curtis Street, Middletown, Ohio. Subsidiary of Armco Steel Corporation. Export: The Armco International Corporation.

Armco
Sewer
Structures

If SAND is your city's SEWER PROBLEM take a tip from FRESNO, CALIFORNIA

This sand pile is part of 15 cubic yards recently removed from a 438 foot section of 24" line in Fresno.

"Flexible" 25 h.p. Bucket Machines were chosen by Fresno as most of the pipes to be cleaned were of large diameter and because they will pull the largest fully-loaded buckets at speeds up to 125 feet per minute.

With 10 different models to choose from, "Flexible" provides a complete range of Bucket Machines to meet all budget problems.

Send for the Bucket Machine Catalog and the name of your nearest distributor.

FREE
DEMONSTRATION INVITED

Flexible INC.
3786 DURANGO AVE., LOS ANGELES 34, CALIF.
(Distributors in Principal Cities)

AMERICA'S LARGEST LINE OF PIPE CLEANING TOOLS AND EQUIPMENT

Explaining the Water Diaphragm Principle of Chlorinator Operation

243. The features, operation and benefits of the water diaphragm principle of chlorinator operation are fully described and illustrated in Publication TA-1026-C-1 recently published by Wallace & Tiernan Inc., Belleville 9, N. J. This helpful publication is yours for merely checking the coupon.

Reference Book on Lubricated Plug Valves

273. Lubricated plug valves, including stick-proof lever sealed valves for easy operation and positive mechanical seal are fully described in reference books issued by Homestead Valve Mfg. Co., Box 550, Coraopolis, Pa. Check the coupon for your copy.

Standard Specifications for C. I. Pipe and Fittings

278. Standard dimensions for cast iron water pipe and special castings are available in convenient booklets offered with the compliments of U. S. Pipe and Foundry Co., Birmingham 2, Ala. Get your copy by checking the coupon.

Helpful Data On Valve Boxes

291. Bulletin 35 issued by Buffalo Pipe & Foundry Corp., Box 55, Sta. B., Buffalo 7, N. Y., gives full details on adjustable valve boxes, extension boxes and roadway boxes for water and gas. Get your copy by checking the coupon.

Couple Pumps and Where to Use Them

194. Turbine pumps, coupled to motors or gear drives, offer many arrangements to suit your pumping needs. Mechanical features, capacity curves and service applications are reviewed in Bulletin C of Layne & Bowler Pump Co., Box 6991, Los Angeles 22, Calif. Check the coupon for your copy.

Precision Line Locator Speeds Maintenance Work

202. Accurate location of buried pipe and cable is made easy with the compact, all-purpose Wilkinson Line Locator, made by Wilkinson Products Co., 3987 Chevy Chase Dr., Pasadena 3, Calif. One-man instrument finds depth as well as location, saves "guesswork" excavations. Get latest data by checking the coupon.

Factors to Consider in Elevated Tank Selection

299. Details on the several different types of elevated steel tanks, including capacity ranges, tank dimensions and other factors to be considered in the selection of elevated tanks for modern water storage, plus discussions of new tanks for old towers and foundations are included in Bulletin 101 of the Pittsburgh-Des Moines Steel Co., Neville Island, Pittsburgh, Pa. Check coupon for your copy.

Trencher Fits Municipal Needs

315. A bulletin describing the Cleveland Model 95 trencher has been published by the Cleveland Trencher Co., Cleveland 17, Ohio. The Model 95, called "The standard machine for city and suburban work", is versatile, maneuverable and economical for use on water lines, service lines, road widening and all utilities trenching. Get this 8-page illustrated bulletin by checking the coupon.

Quick Review of Water Meters

316. A helpful condensed catalog which covers sizes and types of water meters for every kind of service is available from Rockwell Mfg. Co., 400 N. Lexington Ave., Pittsburgh 8, Pa. Each type is illustrated and fully described; specifications and prices are included. Gen Bulletin W-800 by checking the coupon.

Helpful Data on Water Meters

330. It is to the interest of every water works superintendent and engineer to have full data on dependable Badger water meters and related meter products. Complete data on all types of disc, turbine and compound meters, meter test equipment, yokes, strainers and alarm registers are supplied in an attractive binder by Badger Meter Mfg. Co., Milwaukee 45, Wis. Check the coupon for your copy.

Valuable Booklet on Porous Diffuser Plates and Tubes

341. A helpful 16-page booklet published by the Norton Co. is a complete guide for the selection of porous media for installation in rapid sand filters and activated sludge plants. Full data are provided for the consulting engineer. Maintenance of porous media is also discussed at some length. Get Form 140 from Norton Co., Worcester 6, Mass. by checking the coupon.

Modern Filtration of Swimming Pool Water

351. Latest data on filtration systems for swimming pools of 50,000 gallon capacity and over is presented in 24-page bulletin No. 625 by R. P. Adams Co., Inc., 225 East Park Drive, Buffalo 17, N. Y. Design and operating data are provided, together with material to assist you in choosing the right filter for your pool. Check the coupon for your copy of this helpful bulletin.

All About Centrifugal Pumps

361. Where pumping performance counts you want to check your specifications carefully. Investigate the features of Fairbanks-Morse centrifugals. Use coupon or write to Fairbanks, Morse & Co., Dept. P. W., Chicago 5, Ill.

How to Clean and Develop Water Wells

375. The use of Weltone, which combines the cleaning power of Calgon with disinfecting and other chemicals in a safe, highly soluble powder is described in an interesting and informative booklet. For your copy of this descriptive literature write Calgon, Inc., Hagan Bldg., Pittsburgh 30, Pa. or check the coupon.

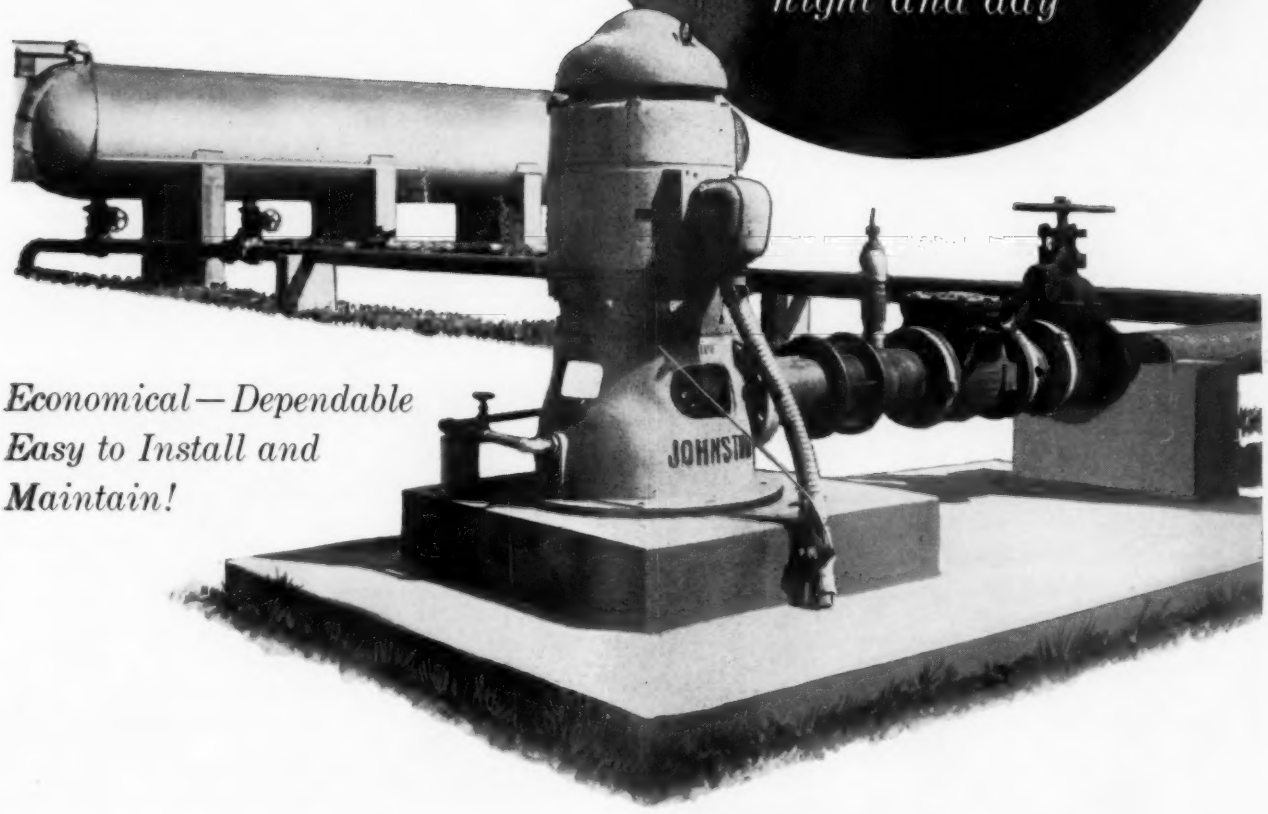
Helpful Engineering Data on Cast Iron Pipe

422. Complete data on McWane Super-DeLavaud centrifugally cast pipe with bell and spigot or mechanical joints is contained in Bulletin WP-54, issued by McWane Cast Iron Pipe Co., Birmingham 2, Ala. Size range includes 2" through 12" diameters, 18 feet long. Check the coupon for your copy.

Wherever water is needed —you'll find

JOHNSTON
VERTICAL PUMPS

are on the job night and day



Economical—Dependable
Easy to Install and
Maintain!

Municipal and county water engineers are among the shrewdest judges of pumps. They know from experience that water supply pumps must be designed to stand up under hard usage day and night, year after year, with minimum down time for repairs. Shown above is a Johnston Pump in use by the Fresno County Water Works District No. 7 —one of many typical Johnston water supply installations. Write for details.

JOHNSTON VERTICAL PUMPS

JOHNSTON PUMP COMPANY
Founded in 1909
Bin "K," Pasadena 15, California

☐ Kindly send colorful bulletin ☐ Have representative call

Name_____

Address_____

City_____ Zone____ State_____

PWM-75

Now's the time to mail this month's Readers' Service card.

To order these helpful booklets check the coupon on page 33.

SEWERAGE AND WASTE TREATMENT

What You Should Know About Trickling Filter Underdrains

20. Specifications for vitrified clay under drain blocks conforming to ASTM standards, suggestions for layout and construction of trickling filter floors, dimensions of standard blocks, channel covers, angles and other fittings are available from the Trickling Filter Floor Institute, c/o Editor, Public Works, 310 E. 45th St., New York 17, N. Y. Check the coupon and we will forward your request.

How to Make Better Sewer Pipe Joints

37. How to make a better sewer pipe joint of cement—tight, minimizing root intrusion, better alignment of joint. Permits making joints in water-bearing trenches. General instructions issued by L. A. Weston Co., Dept. P.W., Adams, Mass.

Complete Sanitation and Process Equipment Bulletin

40. A complete illustrated bulletin gives detailed information on all "Rex" sanitation and process equipment. 36 pages of engineering data, process description, conversion factors. Get Bulletin 51-83 by checking the coupon Chain Belt Co., Box 2022, Milwaukee 1, Wis.

A Handbook of Sewer Cleaning Methods and Materials

44. Complete, easy-to-follow directions for every type of sewer cleaning operations and the equipment needed for effective cleaning work is covered in a 48-page booklet issued by Flexible, Inc., 3786 Durango, Los Angeles 34, Calif. Full details are provided on power cleaning machines, the SeweRodeR, hand tools and all accessories. Water main and culvert cleaning methods are included. Check the coupon for your copy of this helpful handbook.

Theory of Controlled Digestion With Floating Cover Tanks

88. In an excellent 40-page booklet, an authoritative discussion of digestion theory and practices, including design, operation and economics is presented by the Pacific Flush Tank Co., Chicago 13, Ill. Complete data are given on the use of floating covers, together with details on tank construction, piping and control chambers. Requests for this valuable booklet must be made on business letterhead.

Proper Installation of Bituminized Fibre Sewer Pipe

105. A well-planned instruction leaflet showing the proper step-by-step procedure for installation of Bermico bituminized fibre sewer pipe has been made available by Brown Co., 150 Causeway St., Boston 14, Mass. To make sure of best results in pipe installation, just check the coupon for your copy.

Stop Sewage Plant Odor Complaints

137. Effective odor control for sewage treatment plants by use of "Orthosolv" is described in literature of Solvay Process Div., Allied Chemical & Dye Corp., 61 Broadway, New York 6, N. Y. Low cost, convenience and safety are important features. Get full data by checking the coupon.

Efficient Underdrains for Rapid Sand Filters

239. Be sure you have engineering data on vitrified clay underdrains, efficiently designed for filtering and backwashing. Check the coupon or write F. B. Leopold Co., Inc., Dept. PW, 2413 W. Carlson St., Pittsburgh 4, Pa.

Submersible Sewage Ejector Simplifies Installation

275. The Weil submersible non-clog sewage ejector is a compact unit with a completely sealed motor, available in several sizes with capacities up to 300 gpm. For details on unit selection, installation methods, construction features and controls get Bulletin SE-860A from Weil Pump Co., 1530 No. Fremont St., Chicago 22, Ill. Check the coupon.

Maintenance Painting Systems for Sewage Treatment Plants

56. Recommended maintenance painting systems for sewage treatment plants, based on a detailed study of sewage plant painting problems, practices and experience, have been compiled by The Tropical Paint Co., Cleveland 2, Ohio. Virtually all types of plant equipment are considered in some detail, and information is provided on both new work and repainting. Get this helpful report by checking the coupon.

Data Offered on Root-Proof Pipe and Fittings

352. Orangeburg sewer pipe and fittings with root-proof Taperweld joints are described in a comprehensive bulletin offered by Orangeburg Mfg., Co., Orangeburg, N. Y. Detailed information is included on layouts and installation for sewerage and drainage. Get 12-page Catalog No. 306 by checking the coupon.

For Prompt Service Use The Coupon

Tables Simplify Selection of "Flush Kleen" Sewage Ejectors

386. "Flush Kleen" selection is made easy by a series of engineering tables offered in Bulletin 123 by the Chicago Pump Co., 622 Diversey Pkwy., Chicago 14, Ill. Station types, flow determination, pump capacity and procedures for determining total dynamic discharge heads are outlined in detail. Get this useful reference by checking the coupon.

Getting Improved Sludge Dewatering With Non-Clogging Vacuum Filters

425. Latest information on the Komline-Sanderson "Coilfilter", which features non-clogging, permanent filter media to obtain constant output and low operating cost is presented in illustrated Bulletin No. 102 by the Komline-Sanderson Engineering Corp., Peapack, N. J. Be sure to investigate this improved method of sludge dewatering. Check the coupon today.

LB LITTLEFORD

NEW! "TRAIL-O-PATCHER"

Equipment with BUILT-IN ENGINEERING LITTLEFORD

"Trail-O-Patcher" in action: (1) shoveling aggregate into pugmill. (2) metering the bitumen. (3) shoveling finished bituminous mix out of discharge pan.

- The first self-contained all-day bituminous mixer
- 7 tons hot mix per hour

Introduced recently, the Littleford Trail-O-Patcher is already the favorite of highway departments and contractors. The 200-gallon asphalt tank holds an all-day supply.

And there's no dust with the new Trail-O-Patcher, either, because of a tighter sealing container and a more thorough job of mixing.

For complete information on the most advanced bituminous mixer on the market, send today for Trail-O-Patcher bulletin 28. Littleford Bros., Inc., 452 E. Pearl St., Cincinnati 2, Ohio.

Data Offered on Water, Sewage and Waste Treatment Equipment

263. Equipment for sewage treatment, water purification and industrial waste treatment is described in a 16-page Book No. 2440, published by Link-Belt Co., Colmar, Pa. Case histories, photographs and schematic drawings are included. Straightline and Circuline collectors, Thru-Clean and Straightline bar screens, Tritor screens, flash mixers, scum breakers and other units are described. Check the coupon for your copy.

Compact Flow Tube for Measurement and Flow Control

401. The Gentile Flow Tube is a primary metering element (differential producer) designed for accurate measurement and indication of flow. Handles reverse flow and is reproducible. An individual calibration curve is furnished with each tube. Available with secondary indicating, recording or totalizing instruments. To get Bulletin F-T write Foster Engineering Co., Union, N. J. or check the coupon.

Solids Pump Uses Recessed Impeller

428. The Wemco "Torque-Flow" solids pump works with a completely recessed impeller which creates a vortex effect and transmits power exactly as in a fluid type torque converter. This avoids flow through impeller vanes and reduces clogging difficulties when handling sewage sludge or abrasive materials. For full details, get Bulletin SP-10 by writing to Western Machinery Co., 760 Folsom St., San Francisco, Calif., or check the coupon.

STREETS AND HIGHWAYS

What You Should Know About Concrete Culvert Construction

61. An excellent reference book published by the Portland Cement Association, 33 West Grand Ave., Chicago 10, Ill. presents a discussion of culverts and conduits from the viewpoint of the engineer who must design them. Fundamental considerations; practical methods by which economical drainage structures may be chosen, properly located and correctly designed; procedures which permit shortcut design without extended analysis; and illustrative examples are included in this helpful publication. Write to PCA or check the coupon for your copy.

Grading Can Be Faster, Cheaper and Easier

96. You'll like every feature of the Austin-Western 99H Grader. It has all-wheel drive, all-wheel steer, controlled traction, precision sideshift and a high lift, extreme reach reversible blade. Get data from Austin-Western Co., Aurora, Ill.

Levels Sidewalks and Curbs Quickly and Easily

29. How the Mud-Jack Method for raising concrete curb, gutter, walks and streets solves problems of that kind quickly and economically without the usual cost of time-consuming reconstruction activities—a bulletin by Koehring Company, 3026 W. Concordia Ave., Milwaukee 16, Wis. Check the coupon.

Makes Underground Pipe Installation Easy

115. One-man operated hydraulic pipe pusher pushes pipe through ground under streets, sidewalks, lawns and other obstacles. Pays for itself in man hours saved on first few jobs. For complete facts ask for Form E-213, Greenlee Tool Co., Rockford, Ill. Just check the coupon.

Self-Propelled Sidewalk Paver Lays Up to 10 Ft. per Minute

117. Bulletin 52, released by Dotmar Industries, Inc., Kalamazoo, Mich., describes the Dotmar paver, which can lay up to 10 ft. per minute of walk when working with transit mix units. Paver is readily convertible to pave curb and gutter, or integral curb, gutter and walk. Get the 8-page illustrated bulletin for full data and reports from users. Just check the handy coupon.

Tournatractor piles refuse hauled to the dump by six city trucks and numerous privately-owned vehicles. Refuse will be burned at night and then spread and buried by Tournatractor.

2½ hours daily with 1 Tournatractor handles landfill for city of 24,000

After open competition between a number of leading tractors, the City of Longview chose Tournatractor as most suitable for work in its sanitary landfill dump. This unit proved in demonstration that it could handle spread, compaction, and cover so rapidly that the Texas city would be able to dispose of all its garbage and trash at one spot with one machine. After a year of operation, here is a performance report:

Truck-hauled garbage is piled by the Tournatractor during the day, and then burned at night. The following morning, Tournatractor spreads the residue, and covers it by dozing a layer of sand and clay. Big, rubber tires achieve firm compaction in normal travel across the dump. Although they encounter considerable scrap metal in the refuse, tire life is very good, reports Operator J. F. Harkness. The machine has maintained 95% mechanical efficiency, overall, throughout its use.

For sanitary sealing, Tournatractor covers compacted trash with earth blanket. Rats and flies have little chance to breed and the community is spared nuisance of an open dump.

In its spare time, Tournatractor clears timber and brush from much of the 40-acre dump area, maintains haul road to the dump, and does odd jobs around the city.

Travels city streets to other jobs

Work in the dump takes only about 2½ hours of the Tournatractor's day, but the city finds plenty of other jobs for its versatile, rubber-tired machine. It maintains haul roads to the dump, dozes and grades park areas, clears and levels land, constructs out-fall ditches, and handles drainage work for the Longview Water and Sewer Department. More time is available for *working* since Tournatractor goes anywhere under its own power at speeds up to 19 mph. It travels regularly from the landfill dump into the city, covering the 5 miles in about 20 minutes. It wastes no time waiting for trailer, loading and unloading for any job-to-job move.

"Fast and reliable," says Supt.

J. R. Murray, Supt. of Streets and Sanitation, reports, "Tournatractor is ideal for our city work. It is fast and reliable."

Operator Harkness is enthusiastic, too. He says, "This Tournatractor has lots of power and speed. It is so easy to operate I can do a day's job without being tired out."

Ask your LeTourneau-Westinghouse Distributor for more information on Tournatractor performance in sanitary landfill work and on other municipal jobs. He will gladly show you why it can serve your community better than any crawler-tractor.

Tournatractor—Trademark Reg. U.S. Pat. Off. T-446-P-zz

LeTourneau-WESTINGHOUSE Company

Peoria, Illinois

A Subsidiary of Westinghouse Air Brake Company

How new principles in PAYLOADER® design mean greater production at lower costs with these new models

Penetration

Full engine torque applied through torque converter and four-wheel-drive gives powerful, sure traction to penetrate hard-digging materials, even under slippery and loose ground conditions. Operator can also vary the digging angle of the bucket during penetration to meet any condition.

Pry-out action

Tremendous pry-out force can be exerted when necessary by using the break-out pads on the ground as a fulcrum for leverage. Load forces opposing the pry-out action are transferred to the ground through the pads instead of to the axle, wheels and hydraulic system.

Break-out action

The remarkable new system of bucket motion tips the bucket back 40 degrees at ground level in a powerful break-out action that gets heaped loads quick and easy, even in shallow cuts and low piles. Tilt-back action can be slow or fast at the will of the operator.

Thousands use our Readers' Service card to keep up to date . . . do you?

To order these helpful booklets check the coupon on page 33.

Incorporating an entirely new principle of bucket action, these new "PAYLOADER" tractor-shovels deliver more yardage per shift . . . handle heavier digging and are easier and safer to operate than any tractor-shovel of comparable bucket capacity. They pack more horsepower and have longer wheelbases for greater stability and riding comfort. They have easy, responsive power-steering, torque converter drive, 4-speed full-reversing transmissions and powerful hydraulic brakes.

THE FRANK G. HOUGH CO. presents these 2 new "PAYLOADER" tractor-shovels as the finest ever offered in its 35 years of pioneering and leadership in the tractor-shovel industry. So why not set a date and have your "PAYLOADER" Distributor demonstrate.

model HH
1½ CU. YD.

model HU
1 CU. YD.

Stability and balance

You get heaped loads and — most important of all — you *deliver* bigger payloads because the bucket carry position is at full 40-degree tip-back *just off the ground* — low and in-close. The result is minimum spillage plus maximum balance and stability for fast, safe load delivery.

Driver safety, comfort

Underslung boom-arm design and positioning keeps moving members out of operator's reach at all positions. This eliminates the need for safety guards or screens and increases operator visibility. Longer wheelbase and adjustable molded foam rubber seat contribute greatly to riding comfort and ease of operation.

"PAYLOADER" is the registered trademark for tractors and tractor-shovels made by The Frank G. Hough Co. — pioneers and builders of more unit-design tractor-shovels than all other manufacturers combined. "PAYLOADER" units are sold and serviced by the largest, most experienced Distributor organization in the business.

SAY HUFF

PAYLOADER®
MANUFACTURED BY
THE FRANK G. HOUGH CO. LIBERTYVILLE, ILL.
SUBSIDIARY—INTERNATIONAL HARVESTER COMPANY

THE FRANK G. HOUGH CO.
761 Sunnyside Ave., Libertyville, Ill.

☐ Send data on Model HH — 1½ cu. yd.
☐ Send data on Model HU — 1 cu. yd.

Name.....
Title.....
Company.....
Street.....
City.....
State.....

Better Highways Through Salt-Soil Stabilization

162. Practical information for the men who build, repair and maintain our highways is provided in two bulletins issued by the International Salt Co., Inc., Scranton, Pa. General principles of salt-soil stabilization, applications, plant mix and road mix are described. Check the coupon for your copies.

How the "Payloader" Helps Public Officials

190. An attractive new booklet "Getting More for the Tax Dollar with Payloaders" makes worthwhile reading for every public official in charge of construction and maintenance of roads, streets, and utilities. You will find illustrations and data showing dozens of ways the "Payloader" is used by cities, counties and states, plus convenient specifications on seven models. Check the coupon or write Frank G. Hough Co., 761 Seventh St., Libertyville, Ill.

Choosing Trucks For Municipal Service

204. Trucks that are high in efficiency and economy are needed for all municipal services. Be sure to investigate latest models of White motor trucks, engineered for high performance under all conditions. Full details from White Motor Co., Cleveland 1, Ohio. Check the coupon today.

8 Reasons Why You Should Check the Jaeger Loader

207. In a profusely illustrated 16-page catalog devoted to the applications and special design features of the Jaeger "Load-Plus" tractor-loader unit, eight good reasons listed to back up the claim that this machine out-produces any other loader of its size. These include load capacity, balance, reach, maneuverability, automatic power adjustment by torque converter, instant reversal, multiple speed and ease of control. Check them all by getting a copy of Catalog L100-3. Check the coupon today. Jaeger Machine Co., 400 Dublin Ave., Columbus 15, Ohio.

How to Save Time on Curb and Gutter Work

143. Every type of curb and gutter work is illustrated in the 12-page Heltzel catalog on steel forms for building concrete curbs, gutters and sidewalks. Time-saving setups show how to speed up the job and save money. Get your copy from Heltzel Steel Form & Iron Co., Dept. PW, Warren, Ohio.

Check List for Successful Earthmoving Bids

147. Valuable information for the earthmoving contractor and for the engineer who must estimate earthmoving costs is provided in a new two-color illustrated booklet issued by Caterpillar Tractor Co., Peoria, Ill. A convenient check list is included to help select the proper equipment for the job. Check the coupon to get Form No. DE502.

For Prompt Service Use The Coupon

Portable Hot Asphalt Paving Repair Unit

250. Maximum economy in paving repair and maintenance is claimed for the compact "Patchmobile" which has a rotary tube continuous dryer, batching hopper for accurate proportioning, twin hot asphalt tanks, heat jacketed pugmill, tool heaters and hand spray bar. Get latest data from Wylie Mfg. Co., 5926 N. W. 39th St., Oklahoma City 12, Okla. Use the coupon.

Heater-Planer Gives Low-Cost Surface Repairs

287. Low-cost resurfacing and repair work on bituminous pavements is made easy with the Littleford-Clarkmoore Heater-Planer. Machine operates continuously, heating and planing as it travels. Precise control leaves smooth riding surface. Get the details by writing to Littleford Bros., Inc., Cincinnati 2, Ohio, or check the coupon.

How the Mobil-Sweeper Can Improve Street Sweeping

305. Sweeping costs can be cut with the Mobil-Sweeper which features safe highway speeds up to 55 mph, carries 2 2/3 cu. yd. dirt hopper, sweeps swath up to 10' wide with full floating brooms. Hills and deep gutters are no obstacle. Write to the Conveyor Co., 3260 E. Slauson Ave., Los Angeles 58, Calif. or use coupon for complete details on this machine.

Details on Motor Grader Construction and Use

312. In a handsome catalog, profusely illustrated with diagrams and photographs of unusually fine quality, the Galion Iron Works and Mfg. Co., Galion, Ohio, has presented all details on the construction and operating features of their Model 118 motor grader. This impressive 28-page catalog, No. 395, is available without charge. Just check the coupon.

Latest Data on Performance Tested Sweepers

322. Be sure to investigate the outstanding features of Wayne motor pick-up sweepers, fully described in literature of the Wayne Manufacturing Co., 1201 East Lexington St., Pomona, Calif. Effective sweeping, speed, maneuverability and operator convenience are backed up by performance records. Get latest data by checking the coupon.

Auxiliary Equipment For Use with the "Jeep"

326. Be sure to investigate the versatile "Jeep" as a source of auxiliary power in combination with convenient transportation. Power take-off operates air compressors, generators, other equipment. For details write to Willys Motors, Inc., Toledo 1, Ohio, or check the coupon.

Two-Way Radio Equipment For All Departments

363. The benefits of two-way radio communication in the uncongested non-interference 450-megacycle range make full information on

GIVES "CURB SERVICE" on bituminous mixing jobs

As a portable mix plant on rubber tires, Kwik-Mix Bituminous Mixer is easily towed to the job, gives "curb service" mixing anywhere around town. Does direct pouring on street patchwork, loads wheelbarrows. Or, with tower attachment, you get discharge heights up to 8¾-ft., for stockpiling materials or loading into trucks. Mixer also is readily adaptable as stationary elevated plant, mounted on skids. 2 sizes: 10 and 14 cu. ft. Check all the operating advantages, and heavy-duty features with your Kwik-Mix distributor . . . or write to us for catalog.

Mail to: KWIK-MIX CO. 3029 W. Concordia, Milwaukee 16, Wis.
Send us literature on: ☐ 10 ☐ 14 cu. ft. Bituminous Mixers
NAME
TITLE
ORGANIZATION
ADDRESS
KM386PW
(Koehring Subsidiary)

FILTER SAND AND GRAVEL

Produced from an inland pit hence free from river contamination and foreign matter.

Shipment in bulk or bagged.

Many of the larger filter plants throughout the United States are equipped with our products.

PROMPT SHIPMENT

Inquiries and orders solicited.

NORTHERN GRAVEL COMPANY
Muscatine, Iowa
P.O. Box 307 Amherst 3-2711

Now's the time to mail this month's Readers' Service card.

photo courtesy Merritt-Chapman & Scott

HOW CONTRACTORS BEAT TIGHT SCHEDULES

SAVE TIME, LABOR, MATERIALS WITH MOTOROLA *2-WAY RADIO*

With construction work usually sprawled out over a large area and working sites changing frequently, Motorola 2-way radio ties the whole operation together with the most versatile, quickest communications possible . . . gets the job done faster and at less cost.

With radio, key personnel, foremen and superintendents have constant contact with every part of the project. They can answer questions or get their questions answered and give orders without spending non-productive travel time or leaving their posts where they're needed most.

Problems that would take hours to solve are taken care of in minutes using 2-way radio. Equipment needed on a temporary basis is directed to various assignments by radio without wasting any motion or returning "home" first. When breakdowns leave valuable men and machines idle, radio dispatches help immediately, gets them back to work faster. Concrete placing crews can radio changes in requirements to the batch plant immediately and accidents gets fast attention.

Get the facts. Find out how Motorola 2-way radio will pay for itself in a remarkably short time and then add clear profits for you for years to come. To get *all* the advantages radio offers, *insist* on Motorola, serviced by the Motorola man right in your area. Write today for his *experienced* help in planning your radio system.

MOTOROLA

2-WAY RADIO

MOTOROLA COMMUNICATIONS & ELECTRONICS, INC.
A SUBSIDIARY OF MOTOROLA, INC.
4501 AUGUSTA BOULEVARD • CHICAGO 51, ILLINOIS
ROGERS MAJESTIC ELECTRONICS LTD, TORONTO, CANADA

Motorola consistently supplies more mobile and portable radio than all others combined.
Proof of acceptance, experience and quality.
The only COMPLETE radio communications service — specialized engineering . . . product . . . customer service . . . parts . . . installation . . . maintenance . . . finance . . . lease
"The best costs you less — specify Motorola."

Need more facts about advertised products? Mail your Readers' Service card now.

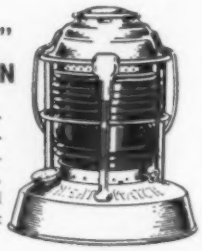
DIETZ

HIGHLIGHTS of SAFETY for the HIGHWAYS and BYWAYS

DIETZ TUBULAR LANTERNS

RED says DANGER — DIETZ LANTERNS say STOP. A complete line of economical, long burning, ruggedly made kerosene lanterns available with Ruby, Clear, Blue, Green or Amber globes, backed by the world's largest and oldest makers of portable light.

DIETZ "NIGHT WATCH" SAFETY LANTERN



A miniature beacon — with "Pencil Beam" — visible from any direction, near and far. Longest burning — well over 100 hours on pint of kerosene.

DIETZ-EMBURY "TRAFFIC-GARD" SAFETY LANTERN

"Magnified-Beam" seen for great distances. Wide, non-tip base. Long burning, economical. Stands rough usage.

DIETZ HIGHWAY TORCHES

Complete line of bomb and flat base, Dietz *Blue* threaded collar burner models, and Dietz-Embury *Red* cam lock models. Tops in rugged quality.

Send for Descriptive Folders

EST. R.E. DIETZ COMPANY SYRACUSE 1, N. Y. 1840

this subject important to all engineers. Get full data on trouble-free systems from Motorola, Inc., Dept. PW, 4545 Augusta Blvd., Chicago 51, Ill. Just check the coupon.

How to Solve the Brush Disposal Problem

277. Fitchburg Chippers, engineered to solve the brush disposal problem. reduce troublesome brush and trimmings to tiny, easy-to-dispose-of chips. Several models are available to meet your needs. May be mounted on truck body or on trailer, tractor or jeep. Full details in interesting, profusely illustrated 16-page bulletin. Write Fitchburg Engineering Corp., Fitchburg, Mass., or check the coupon for your copy.

Use Hot Patch Material On All Maintenance Jobs

297. With the Barber-Greene Mixall you can get hot patch material wherever and whenever you need it for all maintenance jobs. Send for new 8-page bulletin that gives full information on this small, highly portable unit that turns out all types of bituminous patch material in any quantity you need. Write Barber-Greene Co., Aurora, Ill., or use the coupon.

Hot or Cold Patching Mixtures Prepared on the Job

304. By preparing your patching mixtures, hot or cold, right on the job, you can use them immediately with a minimum of handling. Get full data on the McConnaughay Model IITD "Multi-Pug" Asphalt Mixer for fast, easy and economical preparation of patch materials. Write K. E. McConnaughay, Layfette, Ind. or use the coupon.

Tunnels Do It Better

382. Advantages of tunneling to avoid the interference of open trenching under highways, streets and railroads are discussed in a folder issued by Armco Drainage and Metal Products, Inc., Middletown, Ohio. Installation data and specifications on Armco Liner Plates for tunnels and conduits are included. Check the coupon for your copy.

Advanced Tractor Design Gives Better Performance

399. For greater power, performance and economy, Ford Tractor offers 4-wheel stability, built-in hydraulic system and power take-off among the many new features. A complete booklet describes five models in two power series, showing the latest in advanced tractor design. For your copy check the coupon or write Tractor and Implement Division, Ford Motor Co., Birmingham, Mich.

●

CIVIL DEFENSE

Electric Power Wherever You Need It

75. Electric power for every job—for construction, maintenance and emergencies—is always available for the owner of a convenient Homelite carryable generator. These compact, gasoline engine operated units are made in a variety of sizes to suit every power requirement. Get full details by writing Homelite Corp., Port Chester, N. Y., or check the coupon.

Get the Facts on Air Raid Sirens

86. There's more to be considered in air raid warning sirens than the loudness of the signal. Get complete information on efficient size and spacing of sirens from Federal Sign and Signal Corp., 8733 So. State St., Chicago, Ill., by using coupon.

Dependable Standby Power For Water Pumping

342. The use of LeRoi generator sets for dependable low-cost standby power is discussed in an attractive bulletin, No. G-6, issued by LeRoi Div. Westinghouse Air Brake Co., Milwaukee 14, Wis. Detailed specifications are included. Check the coupon for your copy.

Diesel Engines For Municipal Power Needs

359. Dependable power for water supply or flood control pumping stations, stationary or portable electric plants and many other municipal needs can be provided by engines described in literature of the Enterprise Engine & Machinery Co., 18th & Florida Sts., San Francisco 10, Calif. Get latest data by checking the coupon.

●

CONSTRUCTION EQUIPMENT AND MATERIALS

Safety Lantern With Pencil Beam Signal

70. Get information on the Dietz "Night Watch" Safety Lantern with special globe design that saves fuel by intensifying light rays into a pencil beam. Full details available from R. E. Dietz Co., Syracuse, N. Y. Just check the coupon for full data.

How Accurate Boring Speeds Underground Pipe Installations

135. Interesting charts showing earth boring costs, speed and accuracy for holes from 2½" to 14½" diameter and up to 80 feet long are included in 16-page Catalog No. 8 issued by Hydrauger Corp., 681 Market St., San Francisco 5, Calif. Specifications and general operating instructions are also covered.

Motor Buying Information Catalog

149. A 28-page catalog of buying information on a-c motors is available from General Electric Co., Schenectady 5, N. Y. Packed with helpful data, this booklet assists selection of fractional and integral horsepower motors in most general use. To get this booklet, GEC-1026, check the coupon today.

Water Lines Under Pavements Easily Installed

247. With a Trojan pipe pusher and puller no resetting of grip is required, so the work goes twice as fast. Two models, for pipe up to 2" dia. Get full details by checking the coupon. Trojan Mfg. Co., 1114 Race Dr., Troy, Ohio.

Faster Cuts in Concrete Pavement

317. Clean, fast cuts in green or cured concrete and asphalt pavements are easily made with the powerful Champion concrete saw. Perfect balance and "either-side" blade arrangement helps speed the work when sawing joints and cutting outlines for patches. Get full details from Champion Mfg. Co., 2028 Washington Ave., St. Louis 3, Mo. Just check the coupon.

Portable Sump Pump Needs No Priming

324. The BJ Pneumatic Sponge Pump, a self-contained air-powered unit, is built for heavy duty dewatering use on all construction jobs. Full details on this lightweight portable sump pump are contained in Bulletin No. 543-3-900, available from Byron Jackson Co., Box 2017, Terminal Annex, Los Angeles 54, Calif., or by checking the coupon.

All-Purpose Tractor Introduced by Oliver

391. Be sure to get full information on the Oliver Super 55 tractor, a new model designed to do every kind of municipal job. Takes all equipment, front, rear or side mounted; has built-in hydraulic system. Available with gasoline or diesel power. To get all the facts write The Oliver Corp., 400 W. Madison St., Chicago 6, Ill., or check the coupon.

Automatic Cutter Saws Cast Iron Pipe

393. This portable automatic pipe saw, available with either pneumatic or electric drive, makes fast precision cuts in 8-in. to 60-in. cast iron or steel pipe. Features are light weight, minimum clearance required, easy operation even when submerged. Get details from Prescott Tool Co., Inc., Worcester, Mass., by checking the coupon.

You can end them with

ORTHOSOLV

The Chlorobenzene that MIXES WITH WATER

For Low-Cost, Easy Use!

Typical Applications of ORTHOSOLV

- Incinerator smoke
- Sewage plants
- New excess-capacity sewers
- Drainage ditches
- Storm sewers
- Sewer breaks
- De-watering of sludge
- Fish market areas
- Land fill refuse disposal
- Refuse cans and trucks
- Dog kennels
- Rendering plants

NOTE: ORTHOSOLV can be safely recommended to private individuals or business concerns for the elimination of odor-causing conditions.

ORTHOSOLV is a concentrated, 100% active material which affords effective odor control even when diluted with as much as *1 part to 100 parts of water!*

It has been used and proven effective in controlling odors from a wide variety of sources in municipalities all over the country.

ORTHOSOLV solutions are *low in cost* and easy to use with street flushers, pressure pumps and hand sprayers.

If you have a particular odor problem, write us giving details and we will be glad to send you our recommendations for controlling it. For FREE LITERATURE and TEST SAMPLES** use coupon below.

Other Applications of ORTHOSOLV

Orthosolv is also a highly efficient water dispersible solvent-cleaner for the removal of:

1. Grease and tar from trucks and equipment
2. Oils and greases from concrete floors

Orthosolv can be removed with a water flush or a steam jenny. Orthosolv is safe. It has a high flash point and is not a fire hazard.

SOLVAY

*Trade Mark
**In Western Hemisphere Countries only

Mail Coupon Today for Free Literature and Test Samples!

Allied Chemical

SOLVAY PROCESS DIVISION
ALLIED CHEMICAL & DYE CORPORATION
61 Broadway, New York 6, N. Y.

Gentlemen: Please send me WITHOUT COST OR OBLIGATION:**

☐ TEST SAMPLES

FREE LITERATURE:
☐ Orthosolv for Controlling Objectionable Odors
☐ Orthosolv for Use as a Solvent-Cleaner

Name _____

Title _____ Affiliation _____

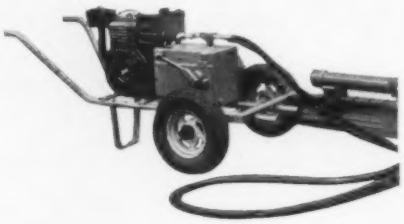
Address _____

City _____ Zone _____ State _____ EF-7

To order these helpful booklets check the coupon on page 33.

"Pipe installation time and labor costs cut about 50% with Greenlee Pipe Pusher"

That's what a leading eastern utility reports as its experience with a GREENLEE Pipe Pusher on jobs as shown above. Let this remarkable tool make big timesavings and reduce job costs for you, too. With the GREENLEE Pusher, *one* man pushes pipe *under* streets, walks, floors, railways, lawns, etc. Eliminates extensive trenching and time-consuming tearing up, tunneling, backfilling, repaving. Often pays for itself on the first few jobs. Two models: No. 790 for pushing ¾" to 4" pipe; No. 795 for larger pipe and concrete ducts.



POWER PUMP for all models of GREENLEE Pipe Pushers. Makes the toughest pushing jobs simple, fast for *one man*. Average pushing performance: two feet per minute. Write today for complete details on timesaving GREENLEE Hydraulic Pipe Pushers.

TOOLS FOR CRAFTSMEN
GREENLEE

GREENLEE TOOL CO., Division of GREENLEE BROS. & CO.
2047 Columbia Ave., Rockford, Illinois

What's Your Digging Problem? Repair Work? Trenches? Footings?

35. At today's prices, hand digging means the job will be costly. You can dig through asphalt and macadam, work fast and efficiently even in cramped areas with the tractor mounted Sherman Power Digger. From one position you can reach to dig 14 feet behind tractor in 140° arc and dig to a depth of 10 feet. For full details check the coupon. Sherman Products, Inc., Royal Oak, Mich.

Lightweight Drill Aids Soil Sampling

228. Two Acker core drills, models LD and LLD, are described in Bulletin No. 21 recently made available by the Acker Drill Co., 725 W. Lackawanna Ave., Scranton, Pa. Used for cutting highway test cores, soil samples, drainage holes and for foundation test drilling, these machines are designed for fast and economical operation. Get the details by checking the coupon.

What Equipment is Needed By Modern Community Services?

328. The importance of modern equipment in work programs is graphically illustrated in the 16-page booklet "Allis-Chalmers Offers New Economy for Villages, Townships, Counties, Cities, States, Federal." Action photographs span the range of community projects and illustrate tractors, scrapers, graders, power units and their multi-purpose attachments. Get this handsome booklet and review your needs today. Allis-Chalmers Mfg. Co., Tractor Div., Milwaukee 1, Wis. Check the coupon.

Economical Scraper Handles Many Heavy Jobs

398. Among the many applications of the versatile Model D Tournapull are: grading and building roads; handling garbage disposal, and grading, leveling and terracing. For details on how its speed, power and ability to work either as a self-loading tool can help your production and lower your costs, write Le Tourneau-Westinghouse Co., Peoria, Ill., or check the coupon.

●

STREET LIGHTING AND TRAFFIC CONTROL

Get Full Data On the Radar Speed Meter

22. Accurate readings of vehicle speeds, with direct indications in miles per hour and a graphic recorder for permanent record are available by use of the Electro-Matic Radar speed meter, a product of Automatic Signal Division, Eastern Industries Inc., Norwalk, Conn. For full data on this device, just check the coupon.

Investigate These Street Lighting Standards

54. You can get complete data on Kerrigan factory-built "Weldforged" street lighting standards, brackets and mast arms by using the handy coupon. Check these strong, well designed, inexpensive steel standards for practical street and highway lighting. Handsome 26-page folder includes data sheets on floodlighting and area lighting applications. Kerrigar Iron Works, 1033 Herman St., Nashville, Tenn

Fast Marker for Traffic Guide Lines

155. Free-floating, adjustable paint shields on the Mark-Rite Econo-Liner follow surface contours and produce sharp lines in any width from 2" to 6". This machine is said to paint 10,000 to 15,000 feet of line per hour. For details get Form E-100 from Universal Mfg. & Sales Co., 5211 Pacific Blvd., Huntington Park, Calif.

A Guide to Effective Traffic Safety

300 A 20-year catalog with hundreds of illustrations of all types of signs used on highways and in motor and pedestrian traffic areas is offered to public works officials by Traffic and Street Sign Co., 84 Foundry St., Newark 5, N.J. This convenient reference covers all your sign needs. For your copy check the coupon today.

How to Save on the Cost of Signs

405. Sign costs have been reduced significantly by many cities, counties and states that switched to Alcoa aluminum for signs and markers. Strength and corrosion resistance cut maintenance costs; aluminum fasteners mean trouble-free installation. For full material specifications write Aluminum Company of America, 1978-D Alcoa Bldg., Pittsburgh 19, Pa., or check the coupon.

New Sign Catalog Has Latest Specifications

417. Detailed information on all classifications of standard signs fo rtraffic control, street identification and other purposes together with a complete line of accessories is presented in a convenient Sign Manual by Lyle Signs, Inc., 2731 University Ave. S. E., Minneapolis 14, Minn. Get Catalog B-55 for most recent data and specifications on U. S. Standard signs. Check the coupon.

●

REFUSE COLLECTION AND DISPOSAL

New Development in Refuse Collection

119. The newly introduced "Dempster-Dumpmaster" system for refuse collection combines the advantages of detachable containers for bulk collection, convenient front-end loading and compaction in a sealed body. Be sure to investigate the application of this system to your collection needs. Complete data offered by Dempster Bros., Knoxville 17, Tenn. Check the coupon today.

How to Dispose of Sewage and Industrial Sludges

281. Get full information on the C. E. Raymond System of combined incineration and sludge drying providing high temperature deodorizing for nuisance-free sludge disposal. Flexible layouts fit large and small communities. Use handy coupon or write Combustion Engineering Inc., Raymond Div., 200 Madison Ave., New York 16, N. Y.

New M-B Packer Body Designed for Maximum Payload

309. The M-B Packer Body, designed to provide maximum payload on a minimum size, low-cost truck, features effective, simple compaction system; provides easy loading, positive discharge, all safety features. Available in 12-14-16 yd. capacities. Get all the facts from M-B Corporation, New Holstein, Wis. by checking the coupon.

●

WEED & DUST CONTROL

What You Should Know About Chemical Weed Control

132. In a convenient 44-page book, the C. B. Dolge Co. gives full details on spraying procedures and chemicals to use for control of lawn and roadside weeds, ragweed eradication and insect control in turf. Get your copy by checking the coupon or write C. B. Dolge Co., Westport, Conn.

Dust Control Made Easy

416. Details on an effective solution for your dust annoyance problems are presented in a colorful bulletin, "Gulf Sani-Soil-Set—the modern, proven agent for controlling dust." Get your copy to learn how this long-lasting, easily applied material can be of help. Write Gulf Oil Corp., 1822 Gulf Bldg., Pittsburgh 30, Pa. or check the coupon.

Get the most work out of Your Specialized Equipment with the

WHITE 3000

Garbage and Refuse!

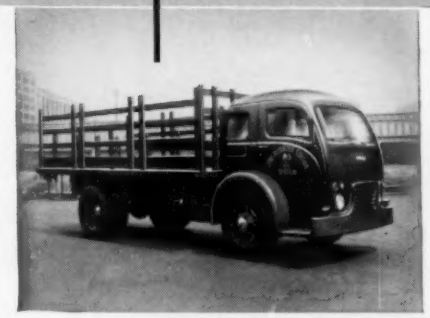
More work done in less time with White 3000 packer-type units or special collection "dumpsters" because of ideal specifications, maneuverability and driver features.

Going Up!

Aerial work of all kinds gets done faster with the White 3000 because of the ideal weight distribution and excellent maneuverability of this most modern motor truck.

Special Services!

Stake bodies, tankers and other special units adapt readily to the White 3000 for greater work efficiency. They get the same functional advantages engineered to exact operating conditions.



Today's special requirements in public service transportation call for the most modern motor truck, and you can be sure it is the White 3000. Its functional design opens new opportunities for efficient service . . . new operating economies.

Engineered to each application for extra work, the White 3000 gets more done . . . in less time . . . at lower cost.

Get the whole story of the White 3000 from your White Representative . . . now!

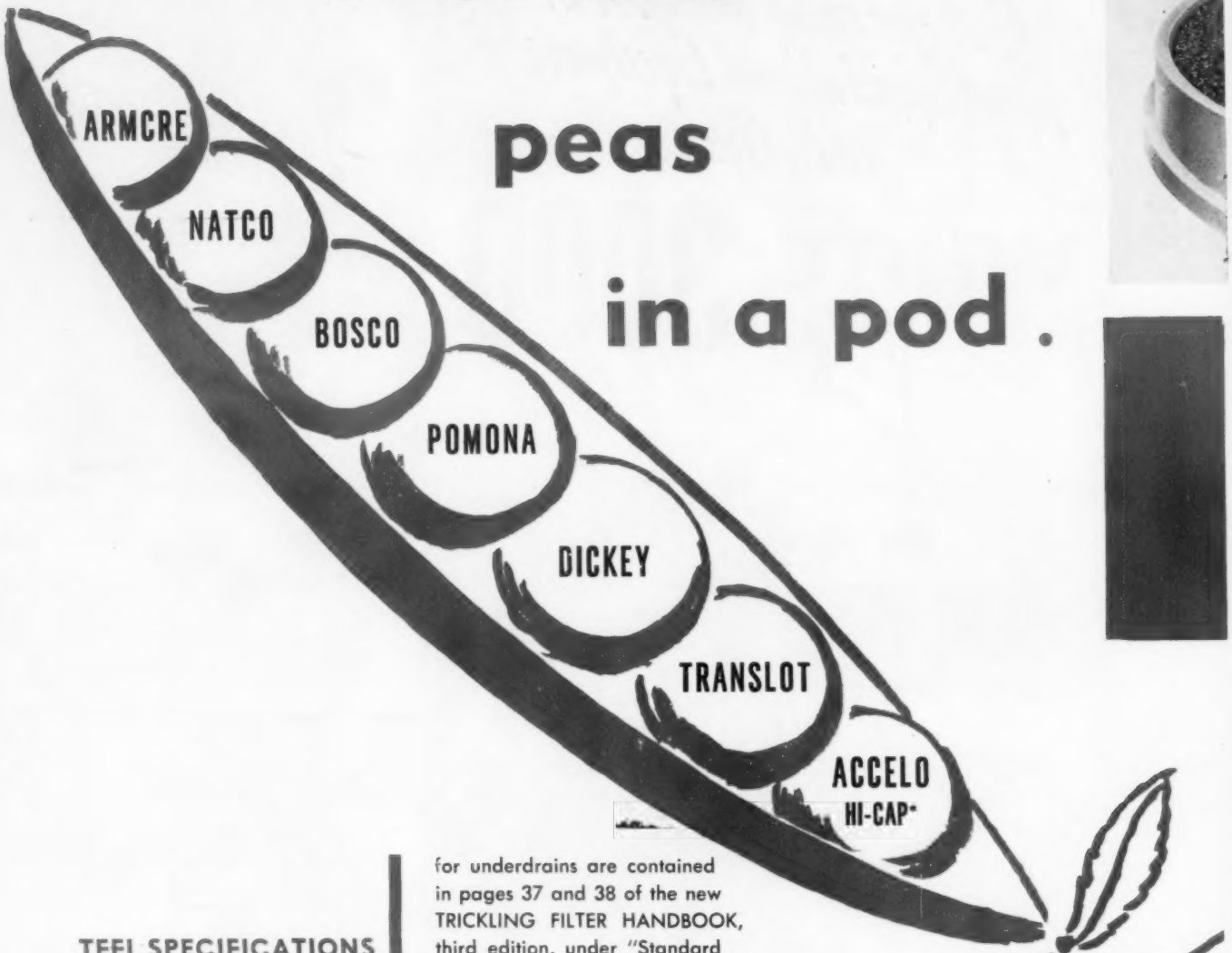
THE WHITE MOTOR COMPANY
Cleveland 1, Ohio

White

FOR MORE THAN 50 YEARS THE GREATEST NAME IN TRUCKS

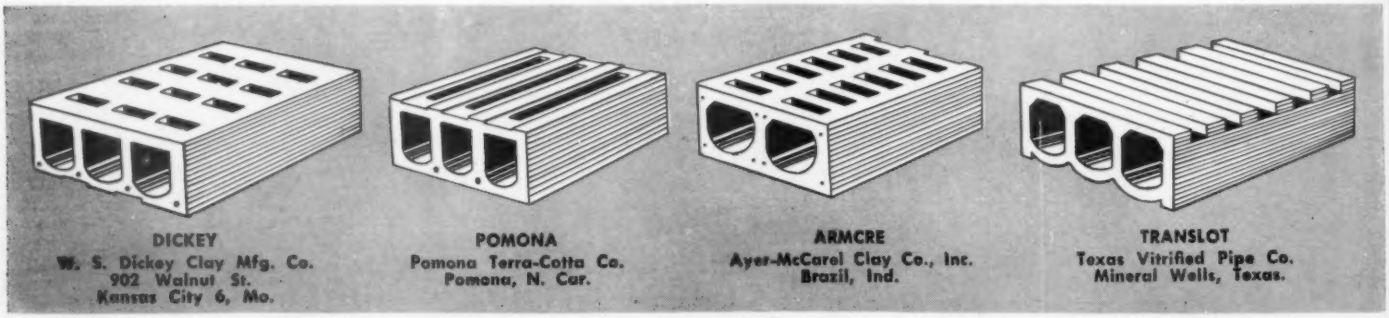
Now's the time to mail this month's Readers' Service card.

Just like peas in a pod.



TFFI SPECIFICATIONS for underdrains are contained in pages 37 and 38 of the new TRICKLING FILTER HANDBOOK, third edition, under "Standard Specifications for Vitrified Clay Filter Blocks for Trickling Filters." Available from any TFFI member.

TRICKLING FILTER

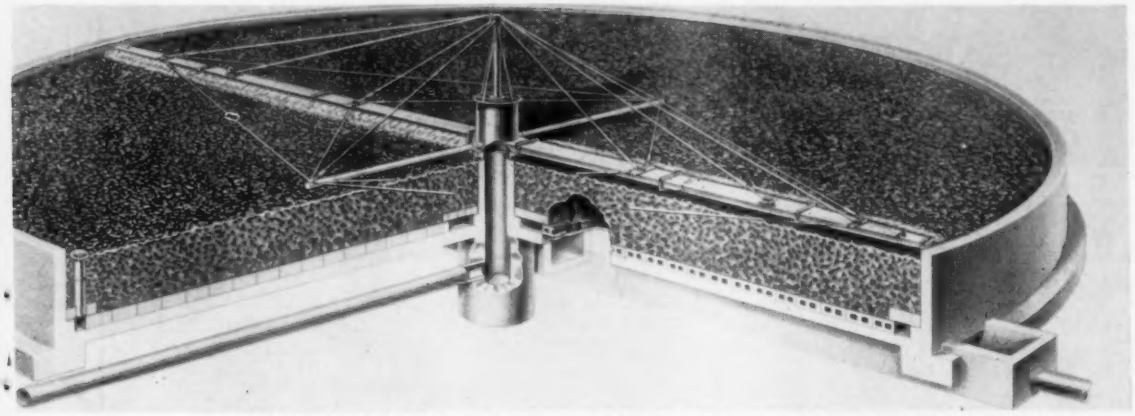


DICKEY
W. S. Dickey Clay Mfg. Co.
902 Walnut St.
Kansas City 6, Mo.

POMONA
Pomona Terra-Cotta Co.
Pomona, N. Car.

ARMCRE
Ayer-McCarel Clay Co., Inc.
Brazil, Ind.

TRANSLOT
Texas Vitrified Pipe Co.
Mineral Wells, Texas.



This drawing, furnished by Dorr-Oliver, Inc., gives a clear picture of the components of a modern trickling filter.

each a little different in size and shape but . . . all designed to give you the best in a trickling filter, *because:*

VITRIFIED CLAY BLOCKS ARE AN INTEGRAL PART OF THESE 6 BIG ADVANTAGES

1 *LOW COST* Overall outlays are generally lower, in the combination of initial and operating costs.

2 *EASY TO OPERATE* Any intelligent man, willing to learn how to perform a few simple tests, can run your plant.

3 *OPERATE AUTOMATICALLY* Can be equipped with automatic controls so that in all ordinary circumstances they operate efficiently.

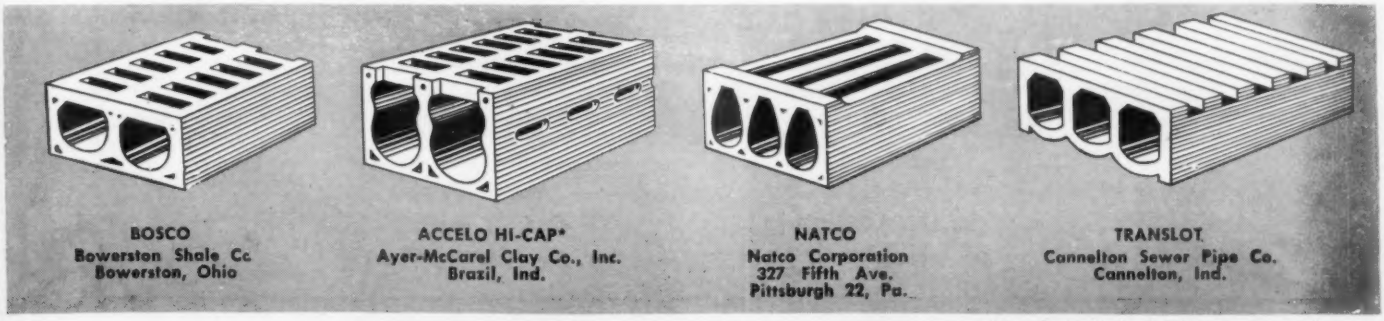
4 *LONG LIFE* Trickling filters are built for long life, to outlive the bonds you issue to pay for them.

5 *GOOD RESULTS* Top-notch efficiency — say 20 ppm BOD — day after day. Your consulting engineer can design for quality of effluent you need.

6 *OVERLOAD NO PROBLEM* Take temporary shock loads in their stride. A new industry in your community offers no new problem here.

Symbol of Good Treatment

FLOOR INSTITUTE



BOSCO
Bowerston Shale Co.
Bowerston, Ohio

ACCELO HI-CAP*
Ayer-McCarel Clay Co., Inc.
Brazil, Ind.

NATCO
Natco Corporation
327 Fifth Ave.
Pittsburgh 22, Pa.

TRANSLOT
Cannelton Sewer Pipe Co.
Cannelton, Ind.

*Reg. Trade Mark of Infilco Incorporated.

Get full details of this month's products . . . mail your Readers' Service card today.

Need more facts about advertised products? Mail your Readers' Service card now.

ORANGEBURG® ROOT PROOF PIPE AND FITTINGS

Accepted Across the Nation!

Approving authorities in leading cities and towns from Maine to California accept Orangeburg Pipe for house sewers and other underground, non-pressure outside uses.

Orangeburg's speed of installation and proved quality are unsurpassed. Over 150,000,000 feet are giving perfect service throughout the country—installations made 49 years ago are still operating like new. That's because Orangeburg's tough, strong material lasts for years underground without deteriorating . . . and because its water-tight joints keep out roots. The lightweight 8-ft. lengths are easy to install . . . and mean fewer joints to make.

Send for Report "A" on Orangeburg's outstanding qualities—written by a prominent sanitary engineer—and for list of prominent cities and towns which permit its use for house-sewers and septic tank connections.

High Flow Capacity

Orangeburg Pipe has very low friction losses due to its smooth bore.

Water-Tight Joints . . .

Orangeburg Root-Proof Pipe and Fittings have no unsanitary leaks—no over-burdening infiltrations.

¼ BEND WYE ⅛ BEND TEE

For septic tank disposal fields, foundation drains . . . all seepage drainage, use Orangeburg *Perforated* Pipe.

Made in 2″, 3″, 4″, 5″ and 6″ sizes.

Write Dept. PW-75 for more facts.

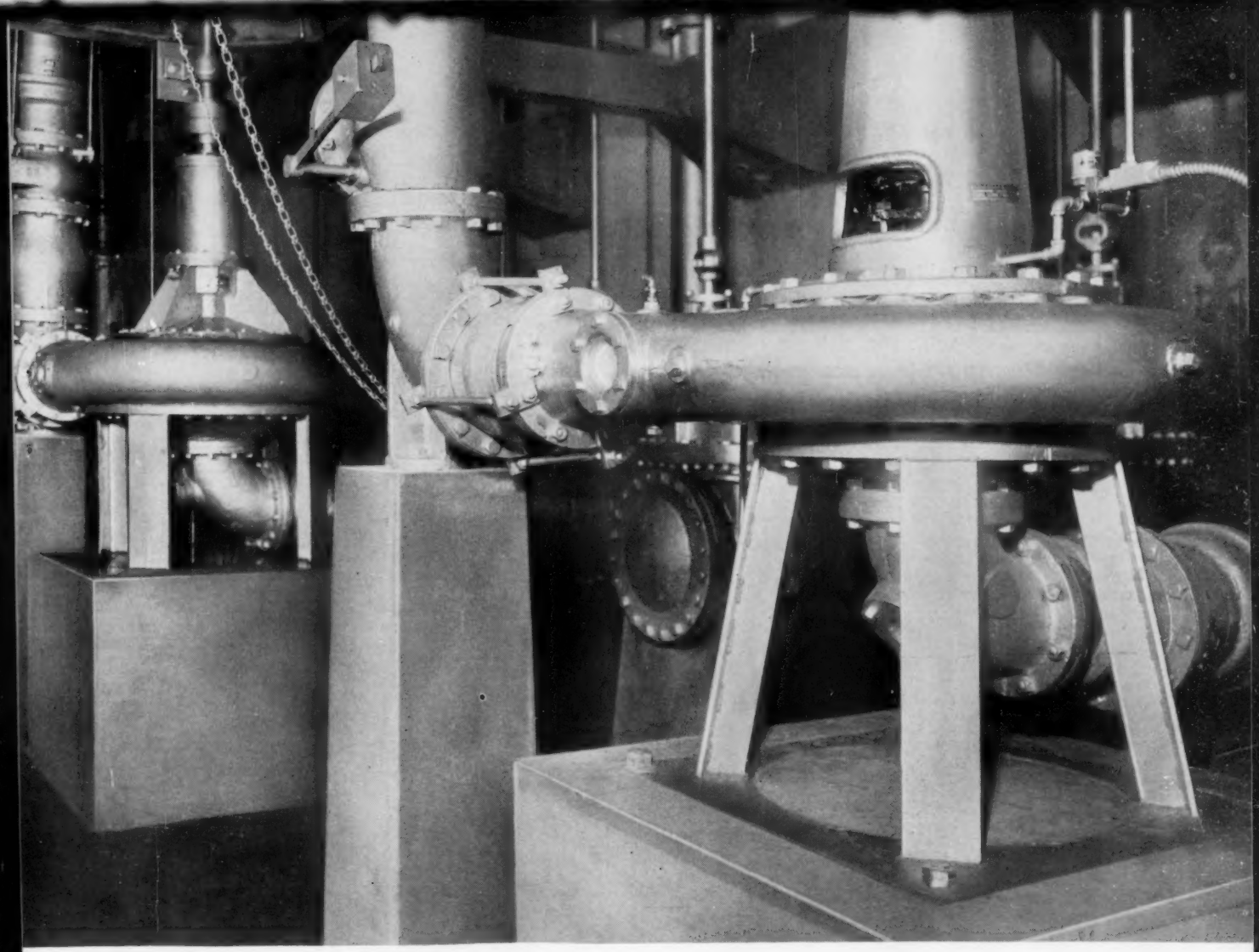
ORANGEBURG MANUFACTURING CO., INC.

Orangeburg, N. Y. West Coast Plant, Newark, California

Thousands use our Readers' Service card to keep up to date . . . do you?

*Reg. Trade Mark of Infilco Incorporated.

Get full details of this month's products . . . mail your Readers' Service card today.



YOU CAN RELY ON YOUR FAIRBANKS-MORSE FIELD ENGINEER . . .

For trash pumps that won't clog

Would you like to cut maintenance costs on your sewage trash pumps 25% . . . 50% . . . even eliminate maintenance costs due to clogging? Call in your Fairbanks-Morse Field Engineer . . . have him give you all the facts on the Fairbanks-Morse Bladeless Impeller Pump . . . the pump that can't clog.

Your Fairbanks-Morse Field Engineer is a pump application specialist . . . can help you select the non-clog trash pump or other sewage plant or water supply pumps that exactly fit your requirements. Because he can recommend from the complete Fairbanks-Morse line, he has a type and size that will solve your problems . . . efficiently and economically.

For complete details, mail the coupon. Fairbanks, Morse & Co., 3601 Kansas Ave., Kansas City, Kan.

FAIRBANKS-MORSE

a name worth remembering when you want the best

PUMPS • SCALES • DIESEL LOCOMOTIVES AND ENGINES • ELECTRICAL MACHINERY
RAIL CARS • HOME WATER SERVICE EQUIPMENT • MOWERS • MAGNETOS

FAIRBANKS, MORSE & CO.
Pump Sales Division
3601 Kansas Ave.,
Kansas City, Kansas

☐ Please send me literature on the Fairbanks-Morse Bladeless Impeller Non-Clog Trash Pump.
☐ Have a Fairbanks-Morse Field Engineer call.

Name_____
Title_____
Address_____
City_____ Zone____ State_____

PATCH roads, streets, and runways the most economical way.

PATCH with permanent hot mix.

PATCH in all seasons with dried, heated aggregate.

PATCH with the machine that produces all mixes (including low slump concrete).

PATCH with the mixes produced on the job site or in a convenient central location.

Only the Mixall has . . . Rotary-drum dryer . . . Twin-shaft pugmill . . . Drying and mixing, independently controlled . . . Low charging skip . . . High discharge.

PATCH

Let us show you how the Mixall can reduce your costs. 54-35-M

Barber-Greene
AURORA, ILLINOIS, U.S.A.

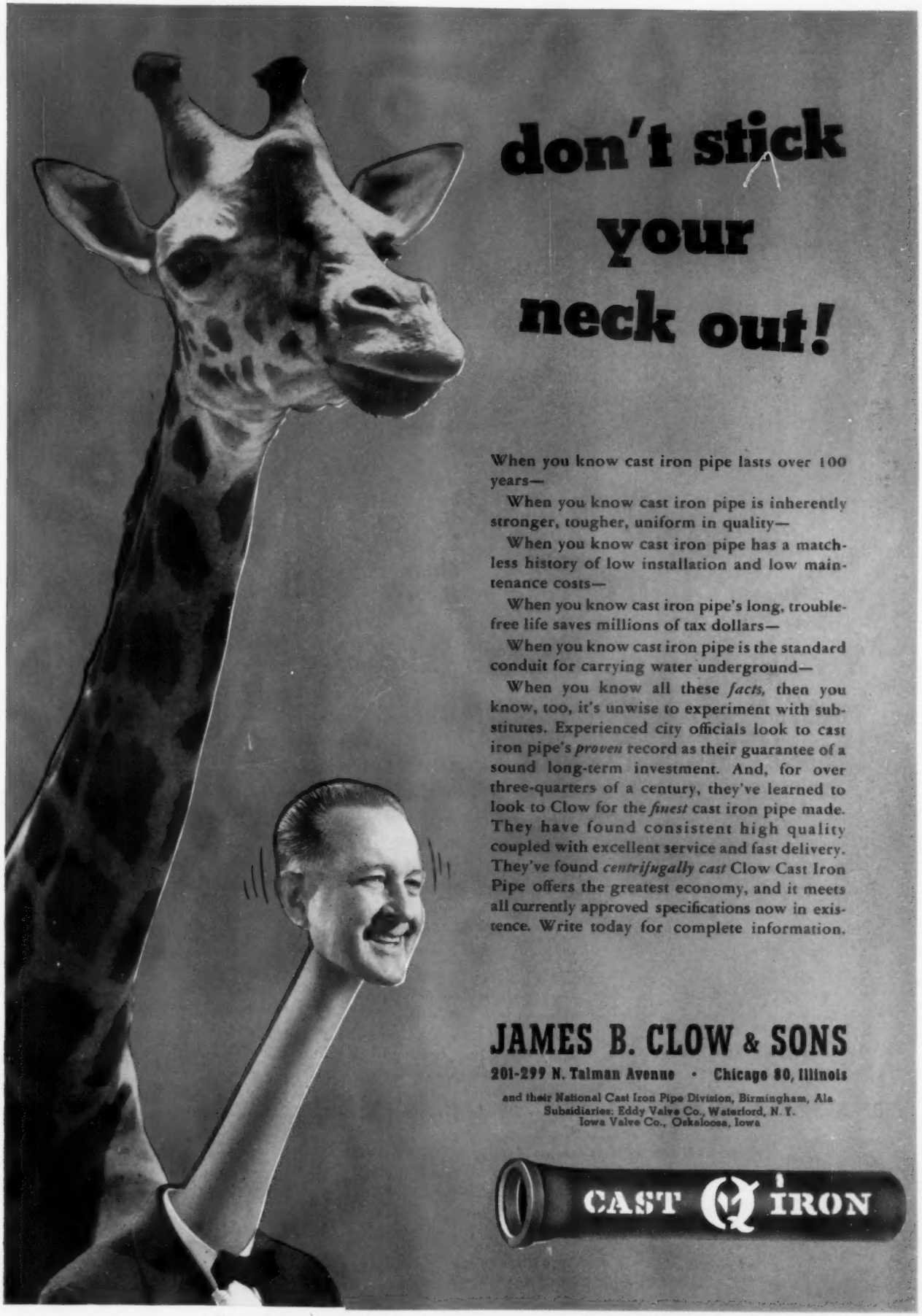
BG

WRITE for INFORMATION

descriptive literature . . . sound movies

cost studies . . . nearby job inspection . . . plant layouts

Now's the time to mail this month's Readers' Service card.


don't stick your neck out!
When you know cast iron pipe lasts over 100 years—
When you know cast iron pipe is inherently stronger, tougher, uniform in quality—
When you know cast iron pipe has a matchless history of low installation and low maintenance costs—
When you know cast iron pipe's long, trouble-free life saves millions of tax dollars—
When you know cast iron pipe is the standard conduit for carrying water underground—
When you know all these *facts*, then you know, too, it's unwise to experiment with substitutes. Experienced city officials look to cast iron pipe's *proven* record as their guarantee of a sound long-term investment. And, for over three-quarters of a century, they've learned to look to Clow for the *finest* cast iron pipe made. They have found consistent high quality coupled with excellent service and fast delivery. They've found *centrifugally cast* Clow Cast Iron Pipe offers the greatest economy, and it meets all currently approved specifications now in existence. Write today for complete information.
JAMES B. CLOW & SONS
201-299 N. Talman Avenue • Chicago 80, Illinois
and their National Cast Iron Pipe Division, Birmingham, Ala.
Subsidiaries: Eddy Valve Co., Waterford, N. Y.
Iowa Valve Co., Oskaloosa, Iowa
CAST IRON

SENT FREE!
Recommended Maintenance Painting Systems for Sewage Treatment Plants
BASED ON A DETAILED STUDY OF SEWAGE PLANT PAINTING PROBLEMS, PRACTICES AND EXPERIENCE
THE TROPICAL PAINT & OIL COMPANY
Recommended Maintenance Painting Systems for Water Treatment Plants
BASED ON A DETAILED STUDY OF WATER WORKS PAINTING PROBLEMS, PRACTICES AND EXPERIENCE
& OIL COMPANY • CLEVELAND 2, OHIO
Sewage Plant Survey
Water Plant Survey

Here's your answer to high-cost maintenance painting

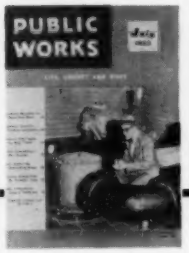
MAINTENANCE EXPERTS POOLED EXPERIENCES TO MAKE THESE VALUABLE SURVEYS AVAILABLE

Exhaustive on-the-job studies by plant maintenance men and paint experts have been condensed to a group of highly practical painting systems to cover all of your needs. They report the best methods to defeat paint-destroying methane, hydrogen sulfide, chlorine, lime, fungi, fumes, mildew and excessive humidity. 158 types of sewage plant equipment and surfaces, above and below water, and 109 water plant surfaces are covered in these surveys. They can simplify and improve your maintenance painting methods, and make substantial savings!

FREE! **Your business letterhead request brings free copies of these surveys while available—write today!**

TROPICAL PAINT COMPANY • 1174-1246 W. 70th St., Cleveland 2, Ohio

Get full details of this month's products . . . mail your Readers' Service card today.



LEADERS IN PUBLIC WORKS

★

Joseph Lustig is City Engineer and Director of Public Works of Janesville, Wisc., and his service with the city goes back to 1911 when he started on a "temporary" basis. He was in the Army during World War I, and continued his studies in Europe briefly after the war. He began his "permanent" status with Janesville on Sept. 1, 1919. He is a graduate of the University of Wisconsin and has supplemented his training with correspondence courses.

He is responsible for all engineering and administration of streets, sewers, water, parks, traffic engineering and planning—a king-size job of many ramifications. He designed and supervised construction of a 9 mg reservoir, saving thousands of dollars in maintenance; of a municipal garage; of 400 acres of developed parks; of a sanitary fill developed from a gravel pit; and of many other facilities.

His hobbies are photography, Mexican travel, landscaping and horticulture. He has considerable appreciation of esthetic values in engineering and is rated as a connoisseur of fine food and liquids. He is "a poet of little distinction" for birthdays and special events at City Hall, and somewhat of a fisherman. He is a member of AWWA, of the Wisconsin Society of Professional Engineers and of the Wisconsin Park and Recreation Society. These data are from Warren C. Hyde, City Manager, who says many nice things about Mr. Lustig, which we regret we do not have room for here.

CONTROL DUST...

Quickly, Effectively, Economically

with Gulf Sani-Soil-Set

GULF SANI-SOIL-SET is the practical answer to your dust annoyance problems. Here are a few of the many good reasons why it will pay you to investigate this efficient dust-control medium now:

HIGHLY EFFECTIVE—Gulf Sani-Soil-Set eliminates dust annoyance completely immediately after application. No long waiting periods are necessary before the ground is ready for use. The dust allaying effect is accomplished by the action of the compound in adhering to and weighing down dust particles.

LONG LASTING—Because of its extremely low volatility and insolubility in water, Gulf Sani-Soil-Set remains effective for long periods. One application per season or year is usually sufficient.

EASILY APPLIED—Gulf Sani-Soil-Set is free-flowing, easy and pleasant to use. It can be applied by hand-sprinkling or by sprinkling truck, and spreads quickly.

SAVES MAINTENANCE EXPENSE—Gulf Sani-Soil-Set minimizes dust annoyance and expense in near-by houses, stores, and laundries.

Write, wire or phone your nearest Gulf office today and ask for a demonstration of the advantages of this modern proven dust allayer. If you have not yet received a copy of the pamphlet which gives further information on this quality Gulf product, mail the coupon below. Gulf Oil Corporation · Gulf Refining Company, Gulf Building, Pittsburgh, Pennsylvania.

GULF

Gulf Oil Corporation · Gulf Refining Company
1822 Gulf Building, Pittsburgh 30, Pa.

Please send me, without obligation, a copy of your new pamphlet, "Gulf Sani-Soil-Set—the modern, proven agent for controlling dust."

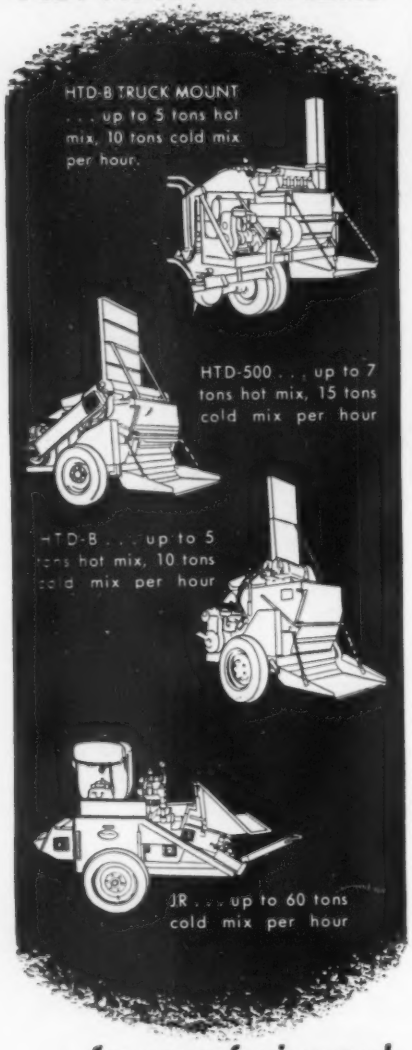
Name.....

Title.....

Address.....

Thousands use our Readers' Service card to keep up to date . . . do you?

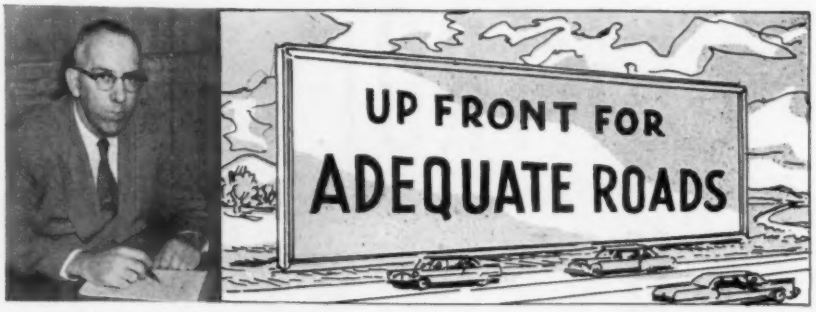
McConnaughay ASPHALT MIXERS


HTD-B TRUCK MOUNT . . . up to 5 tons hot mix, 10 tons cold mix per hour.
HTD-500 . . . up to 7 tons hot mix, 15 tons cold mix per hour
HTD-B . . . up to 5 tons hot mix, 10 tons cold mix per hour
JR . . . up to 60 tons cold mix per hour

. . . for resurfacing and patching in any season

Designed for economy of operation and fast production, the McConnaughay line of Asphalt Mixers meets every need for most resurfacing as well as all types of pavement patching. Working on location, McConnaughay HTD Mixers provide the *exact amounts* of materials needed and effectively remove both moisture and solvents from bituminous mixtures . . . positive assurance that patches and resurfaced areas will set up hard. For details and specifications on the mixers above and on the JR and HTD-LP models (not illustrated), write, wire or 'phone . . .

ASPHALT EQUIPMENT CO., INC.
3929 Buell Drive, Fort Wayne, Indiana
National distributors for
K. E. McConnaughay, Lafayette, Ind.

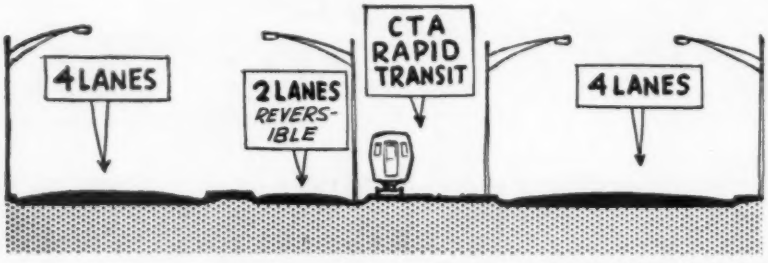


by LEO J. RITTER, JR.

Federal Highway Legislation—Well, got belted by the Senate late in May, when that body voted down the Eisenhower plan by a 60-31 count. By voice vote, the Senate passed the Gore bill and sent it on to the House. Basically, the Gore bill provides federal aid of about $12.6 billion over a period of 5 years, much of it earmarked for the National System of Interstate Highways. The bill contained a provision for 90-10 matching ratio for the portion of the program intended for the Interstate System. In all, the bill would require expenditure of about $5.4 billion (5 years) in matching funds by the states. The issue is far from settled, however, since the House bill has not even been reported out of Committee yet; the House is believed to be much more favorable to the Eisenhower plan than the Senate. The result may well be that the bill passed by the House will be so different from that passed by the Senate that compromise will not be possible until the end of this year, if at all during this session.

Chicago's Northwest Expressway—A new design which will provide Chicago's proposed N. W. Expressway with not only tracks for rapid transit but also reversible auto lanes has been developed by Roger Nusbaum, state expressway engineer. The design is illustrated in the sketch below. It will provide six lanes of traffic in-bound to Chicago's loop in the morning and the same number outbound at night.

Traffic Statistics — One of the papers presented at the June convention of the American Society of Civil Engineers was "Traffic Accident Analysis—A Five Year Study on Missouri State Highways" by L. W. Corder, Traffic Engineer of the MSHD. The paper bristles with statistics, but one set struck our attention. Those related to a comparison between accidents on Missouri state-maintained highways on S-D day (December 15, 1954) with similar days in previous years. The figures are given below:



Courtesy Chicago Daily News

Colorado Program — Late in May, Governor Johnson of Colorado released to the press the states record $46 million highway budget.

	No. of Accidents	No. of Fatalities	Weather
S-D Day, 1954	26	0	Clear, dry
12/15/53	21	2	Clear, dry, some snow
12/15/52	27	5	Clear, dry, some ice
12/15/51	45	1	Considerable ice
12/15/50	18	0	Clear, dry, some rain
12/15/49	17	3	Clear, dry

Handles Dozens of Jobs...

FAST, EASY LOADING—Ford Tractor and loader speed snow removal; salt and chemical handling; dirt, sand and gravel loading. Versatile, maneuverable, easy to operate.

BETTER BLADING—You can use a Ford Tractor and rear blade to shape crowns, level berms, mix aggregate, grade, backfill and ditch. Fast, easy hydraulic operation.

ECONOMICAL MOWING—Ford Tractor and rotary cutter speed roadside and golf course mowing, clear bridle paths and park trails. Exceptionally low maintenance costs.

...the Low Cost FORD TRACTOR

LOW COST DIGGING—Ideal for water, gas, sewer and street department work. Used by smaller communities for sanitary landfill garbage disposal. Compact, easy to operate.

FAST, CLEAN SWEEPING—Ford Tractor and broom keep streets, gutters, sidewalks and parking areas clear of trash and dirt in the summer, leaves and snow in the winter.

LOWER TRENCHING COSTS—Ford Tractor with trencher saves time and labor on road and street construction, utility service connections, sewer and drainage systems.

Ford TRACTORS

TRACTOR AND IMPLEMENT DIVISION
FORD MOTOR COMPANY
Birmingham, Michigan

Now, as never before, Ford Tractors meet the needs of governmental units.

First, because there are now a number of Ford Tractor models from which to choose. There are power sizes to fit a wider range of governmental requirements, low prices to fit almost every community budget.

Second, because Ford Tractors are adaptable to many different types of work. They can be equipped to handle a great variety of jobs, so they stay busy all year long.

It's this versatility that cities, townships and counties like *best* about Fords. But there's much more they like, too. Ford Tractor economy, speed, and ease of operation mean worthwhile savings in time, money and manpower.

See how you can stretch tax-dollars by handling dozens of *your* jobs with a low-cost Ford Tractor. Call your nearby Ford Tractor and Equipment Dealer and get the facts first-hand.

Now's the time to mail this month's Readers' Service card.

TRENCHING ON THE TURNPIKES AND THE THRUWAYS

Herkner Construction Co.'s CLEVELAND *cuts underdrain trench adjacent to a catch basin at Route 21—Turnpike Interchange.*

One of four CLEVELANDS *owned by Harry Miller Excavating Co. digging trench for drain tile on approach to Route 8—Turnpike Interchange.*

CLEVELANDS dig many miles of trenches required for Ohio's first Super Highway

If you were to travel along the Ohio Turnpike *now*, while it is under construction, you could not go many miles on any part of it without seeing a CLEVELAND trencher or backfiller at work. These highly efficient machines are digging and filling many miles of trenches required for the drainage of water from the turnpike itself, as well as its interchanges, its overpasses and underpasses, and the approaches to them . . . plus many more miles of trenches for the restoration of farm drainage systems along the right of way . . . for relocating gas, water and oil pipelines . . . and for installation of lighting cables, etc.

This widespread use of CLEVELANDS in the construction of the Ohio Turnpike parallels their extensive application in the building of such famous highways as the Pennsylvania and New Jersey Turnpikes, Oklahoma's Turner Turnpike and the New York Thruway. CLEVELANDS will continue to be important factors in the swift and economical completion of America's huge highway program for the future—the largest highway program undertaken in history.

Your local distributor will show you how Clevelands do more—for less

THE CLEVELAND TRENCHER COMPANY • 20100 St. Clair Ave., Cleveland 17, Ohio

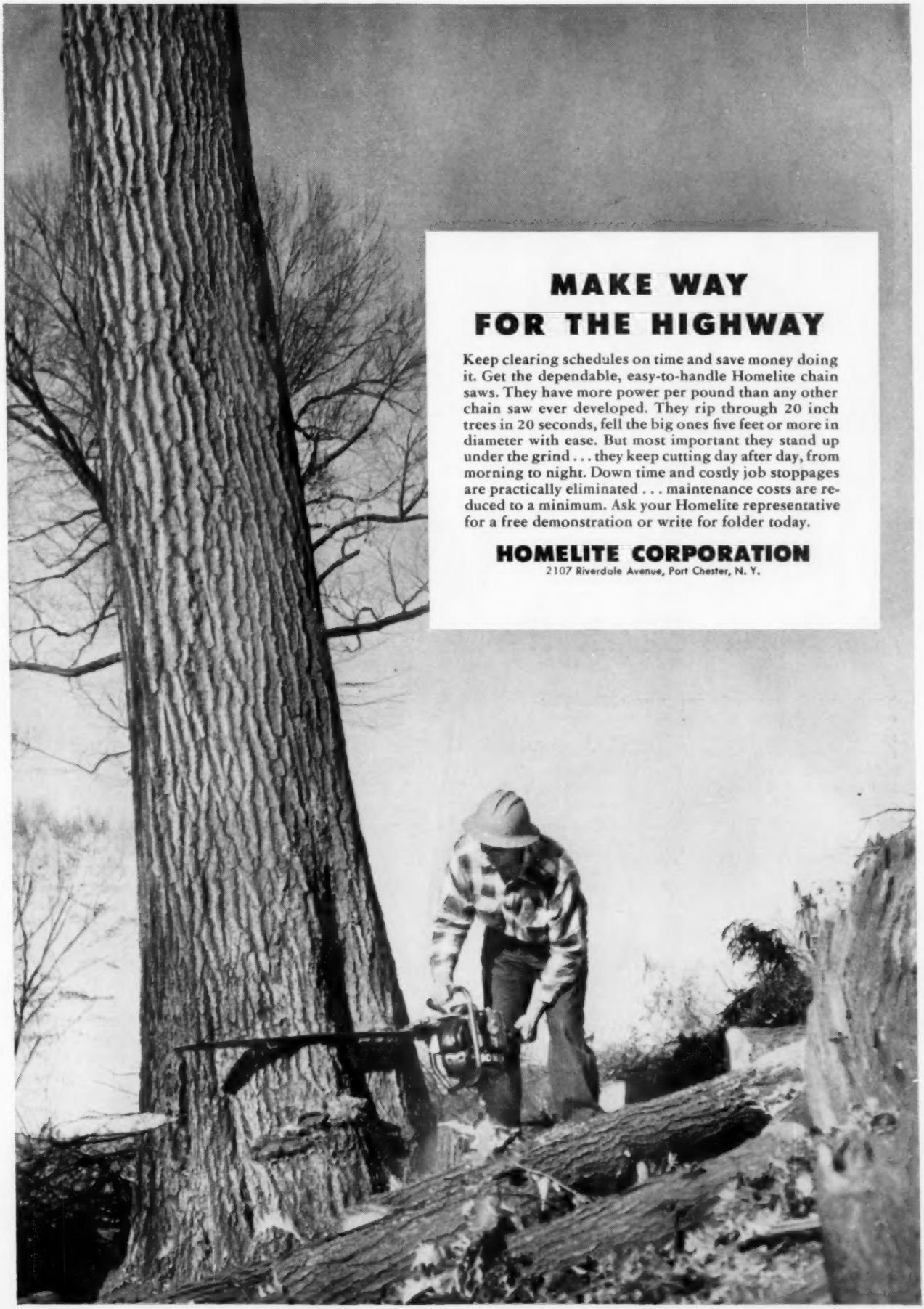
CLEVELAND

Need more facts about advertised products? Mail your Readers' Service card now.

Johnson released the budget without acting on it, an unusual procedure. He said he wouldn't sign it until he knows what sort of highway legislation the federal Congress is going to enact. The Governor called the budget a "splendid" one, but noted that it provides 12 million dollars of state funds that are not matched by federal funds. The largest single sum is about $3.5 million dollars for another portion of Denver's Valley Highway. Other large projects include a section of U. S. 85-87 from the edge of Fort Carson toward Pueblo, the Pueblo Freeway, and a new location for U. S. 6-40 through Idaho Springs. The Denver Post, long a bitter critic of Colorado's highway system, notes that, although 12 million dollars of the budget is for four-lane construction, there still will be no continuous four-lane route connecting major centers of population. The budget makes no provision for any toll highway tunnel construction, although proposals for an all-weather toll tunnel connecting the western and eastern slopes of the Colorado Rockies are under discussion at the present time.

Material Handling — Enjoyed a brief visit to the 6th National Materials Handling Exposition in Chicago's International Amphitheatre in the middle of May. This is a real fine show, with perhaps 100 exhibits, large and small. Much of the show is devoted to industrial material handling, but earth, rock, etc., is also a material, so that a number of the manufacturers who are prominent in the highway field had interesting exhibits. These included Frank G. Hough, Allis-Chalmers, R. G. LeTourneau, Gar Wood, Barber Greene, Caterpillar, and a whole group of crane-shovel manufacturers—Thew, Bay City, Wayne Crane, Schield Bantam, Northwest, Coles, Unit, and Bucyrus-Erie. A number of these manufacturers had regular, full-size machines on display. One of the most interesting exhibits was that of the Thew Shovel Company, which had a couple of machines on hand; an electrically controlled, small-scale model in operation; and a closed-circuit television show. With the television hook-up you could talk to the operator of a Lorain Crane in a nearby steel yard, tell him what you wanted him to do with the machine, and then watch on television as your request was carried out.

Concrete — Although it has nothing directly to do with high-

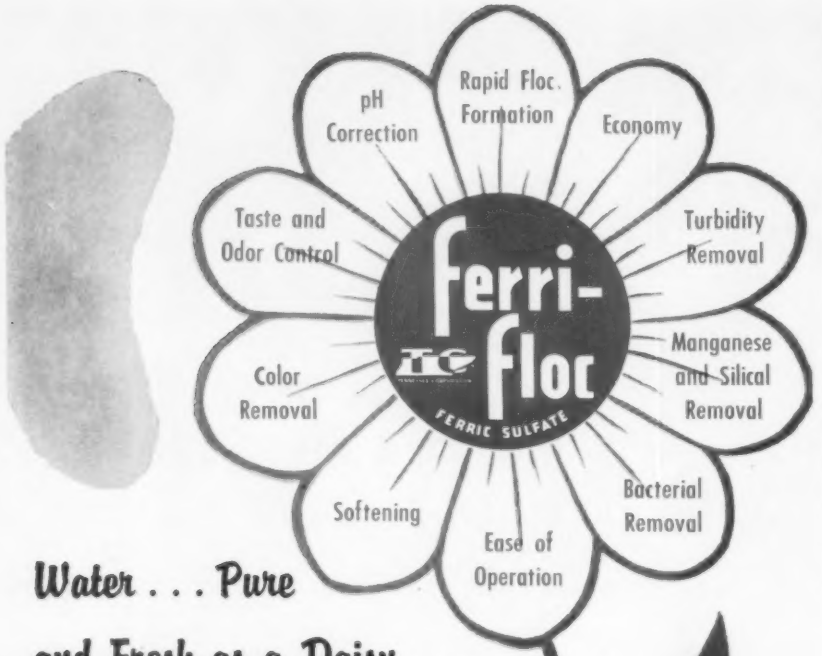


MAKE WAY FOR THE HIGHWAY

Keep clearing schedules on time and save money doing it. Get the dependable, easy-to-handle Homelite chain saws. They have more power per pound than any other chain saw ever developed. They rip through 20 inch trees in 20 seconds, fell the big ones five feet or more in diameter with ease. But most important they stand up under the grind . . . they keep cutting day after day, from morning to night. Down time and costly job stoppages are practically eliminated . . . maintenance costs are reduced to a minimum. Ask your Homelite representative for a free demonstration or write for folder today.

HOMELITE CORPORATION
2107 Riverdale Avenue, Port Chester, N. Y.

Need more facts about advertised products? Mail your Readers' Service card now



Water . . . Pure

and Fresh as a Daisy . . .

Ferri-Floc

the Superior Coagulant!

You can readily see why the many users of Ferri-Floc consider it the superior coagulant. Whatever your specific water treatment problem may be, you can figure on Ferri-Floc to do the job adequately, efficiently and economically. A partially hydrated ferric sulfate, Ferri-Floc is a stable, free-flowing granular salt which can be fed with few modifications through any standard dry feed equipment. It is only mildly hygroscopic, thereby permitting easy and safe handling, as well as storage in closed hoppers over long periods of time.

Water Treatment

Efficient coagulation of surface or well waters. Aids taste and odor control. Effective in lime soda-ash softening. Adaptable to treatment of nearly all industrial waters.

Sewage Treatment

Efficient coagulation over wide range of pH values encountered in sewage treatment. Especially adapted for conditioning of sludge prior to vacuum or drying on sand beds.

TENNESSEE TC CORPORATION

617-29 Grant Building, Atlanta, Georgia

SULFUR-DIOXIDE HIGHEST QUALITY SO_2 **Sulfur-Dioxide**

SULFUR-DIOXIDE is effectively used for dechlorination in water treatment and to remove objectionable odors remaining after purification.

COPPER SULFATE TC **Copper Sulfate**

COPPER SULFATE will control about 90% of the microorganisms normally encountered in water treatment plants more economically than any other chemical.

Free New Booklet!

Let us send you without charge a 38-page booklet that deals specifically with all phases of coagulation.
Send postal card.

Thousands use our Readers' Service card to keep up to date . . . do you?

ways and streets, you may be interested to know that we picked up a very interesting "Concrete Chart" from, of all people, the Chevrolet dealer in Lorain, Ohio. Copyright by GMC, it is apparently available from *your* dealer. It was designed and prepared to inform the "amateur" on fundamentals in the preparation and use of concrete. It presents, attractively and accurately, basic information about ingredients, proportioning and estimating, mixing, forms and bed preparation, placing of concrete and finishing, curing, useful tools, and other miscellaneous items. It also has some information about concrete masonry and brick work.

Books — The new Handbook of *Drainage and Construction* is now available from Armco Drainage & Metal Products, Inc., Middletown, Ohio. It has 592 pages, 380 illustrations, and sells for $5.00. This is one that is really worth having in your library. Another new publication of value is the *Policy on Maintenance of Safety and Traffic Services*, released by the American Association of State Highway Officials, 917 National Press Building, Washington 4, D. C. The AASHO will also publish the *seventh* edition of *Standard Specifications for Highway Materials and Methods of Sampling and Testing* very shortly.

An Old Friend — We've been looking over a report done by an old friend of ours, Charles M. Upham, formerly major domo of the American Road Builders' Association. The report is entitled "Egyptian Highway Study" and is the result of several years of work by Charles M. Upham Associates, Inc., of Washington, D. C., under the general auspices of the Foreign Operations Administration. Mr. Upham tells us he is going to continue his work in Egypt.

Stuff'n Things — Better lay your plans now—the Second World Meeting of the International Road Federation will be held in Rome early in October. The National Association of County Officials meets July 17-20 in Richmond. Work is essentially complete on the new joint research laboratories building on the Campus of Georgia Institute of Technology (Atlanta); it will house the Materials and Testing Division of the Georgia State Highway Department and also provide space for instruction and research in highway engineering.

Need more facts about advertised products? Mail your Readers' Service card now.

Chardon, Ohio solves water problems

WITH A

BJ SUBMERSIBLE

Difficult problems overcome—yet water costs only 3½ cents per 1000 gallons!

The town of Chardon (pop. 2,478) in Gauga County, Ohio, faced these difficult problems in solving a primary water supply pump selection:

1. The proposed pump site was a flood area.
2. The site was on the town's golf course where unsightly structures or pump houses could not mar the landscape.
3. The pump installation would be 1½ miles from the overhead water tower.

RESULTS TALK!

The Chardon Board of Public Affairs worked with Byron Jackson Co. engineers. A 30 horsepower BJ Subette, capable of pumping 250 gpm against a head of 360 ft., was installed in a simply-constructed pit in the marshy area. Unseen and completely submerged, this single Subette pumps one-half of the town's water supply. It eliminated the need for an unwanted and expensive pump house and solved the dangers of flood-out during high water periods. In addition to solving these difficult installation requirements, the BJ Subette is pumping water at an operating cost of only 3½ cents per 1000 gallons!

The BJ Subette answers primary water supply and booster pumping needs of the smaller municipal user. For larger cities, BJ Submersible models are available in capacities to 20,000 gpm and heads to 1800 ft.

Write for complete information

BJ

SINCE 1872

Byron Jackson Co.

PUMP DIVISION

P.O. Box 2017, Terminal Annex, Los Angeles 54, California

Sales offices in all principal cities

It's a fact . . . our handy Readers' Service card is the way to get new catalogs.

Thousands use our Readers' Service card to keep up to date . . . do you?

Playing sandlot baseball is a thrill for any boy. But it's real big-league stuff to play ball under the lights. The same Westinghouse floodlights that illuminate most major-league ball parks. For youngsters in playgrounds, floodlighting means a full schedule of their favorite sport. For parents, it means their child can participate in organized sports after dark . . . away from busy streets and corner hangouts.

How about your city playgrounds? Are you utilizing your present facilities for after-dark recreation?

Ask your nearby Westinghouse distributor for a copy of *Planned Sportslighting,* bulletin number B-5872, or write Westinghouse Electric Corporation, Lighting Division, Edgewater Park, Cleveland, Ohio.

J-04386

YOU CAN BE SURE... IF IT'S Westinghouse

Now's the time to mail this month's Readers' Service card.

It's a fact . . . our handy Readers' Service card is the way to get new catalogs.

on BIG expressway projects

...LOOK FOR CLAY PIPE

In Chicago's new Wacker Drive Extension, part of a $469 million expressway program, thousands of feet of Vitrified Clay Pipe in diameters ranging from 8 to 27 inches are being installed. As in similar projects all over the country, this modern expressway cuts through dozens of existing sewerage lines. Replacement lines running under these busy traffic arteries *must* give long, trouble-free service. That's why you find Vitrified Clay Pipe specified time and again on these vital projects.

Clay Pipe has the strength to stand up under heavy surface loads, and it *keeps* that strength through generations of service. Acid sewer gases or corrosive industrial wastes can't weaken it. *It never wears out.*

Vitrified
CLAY PIPE
CLAY PIPE NEVER WEARS OUT!

C-755-1

NATIONAL CLAY PIPE MANUFACTURERS, INC.
1520 18th St., N.W., Washington 6, D. C.

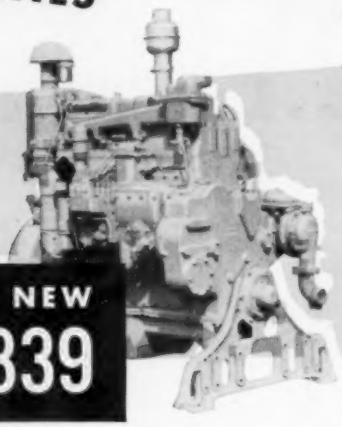
206 Connally Bldg., Atlanta 3, Ga.
100 N. LaSalle St., Rm. 2100, Chicago 2, Ill.
703 Ninth & Hill Bldg., Los Angeles 15, Calif.
311 High Long Bldg., 5 E. Long St., Columbus 15, O.

Need more facts about advertised products? Mail your Readers' Service card now.

New from CATERPILLAR!

TWO MODERN, COMPACT, HEAVY-DUTY DIESEL ENGINES

THE NEW D342



THE NEW D339

THE NEW D342	BRIEF SPECIFICATIONS:	THE NEW D339
190 HP	**INTERMITTENT OUTPUT** Maximum recommended for loads of short duration (1 hour or less) with equal periods at idle or low load.	126 HP
171 HP	**RATED OUTPUT** Maximum recommended for loads of moderate duration (12 hours or less) with equal periods at idle or low load.	112 HP
152 HP	**CONTINUOUS OUTPUT** Maximum recommended for loads of unlimited duration.	100 HP
	All at 1200 r.p.m. with full equipment	
6	Number of cylinders	4
5¾ in. x 8 in.	Bore and stroke	5¾ in. x 8 in.
1246 cu. in.	Piston displacement	831 cu. in.
1200	Rated speed, r.p.m.	1200
425	Low idle speed, standard r.p.m.	425
	Both engines four-cycle, valve-in-head	

CHOICE OF STARTING SYSTEMS!

Air Electric Gasoline

FUEL SYSTEM DESIGNED FOR ECONOMY!

MANY OTHER IMPORTANT FEATURES!

Here are the latest advances in diesel engine design. They offer you better operation, less maintenance, higher horsepower, more compact design. Call your Caterpillar Dealer today for full details on both of these compact, modern new engines. Remember him, too, for complete installation and prompt service.

Caterpillar Tractor Co., Peoria, Illinois, U. S. A.

We'd be glad to send you more information on the new D342 and D339. Just mail the coupon below.

CATERPILLAR TRACTOR CO., Dept. 221
Peoria, Illinois, U. S. A.

Send me complete details on the new D342 and D339.

Name_____

Address_____

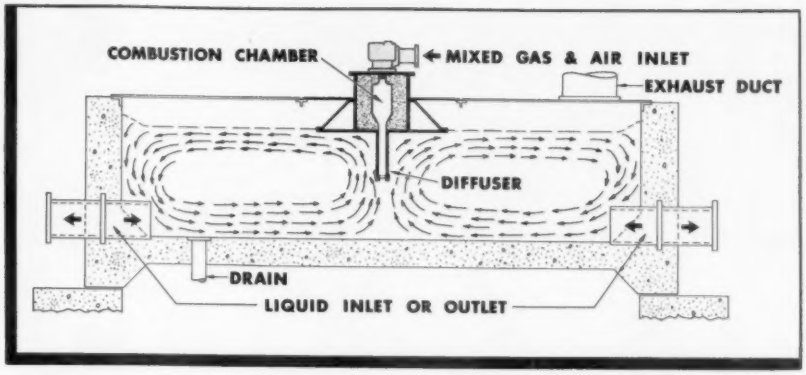
City_____ State_____

CATERPILLAR*

*Both Cat and Caterpillar are registered trademarks – ®

THE D342 AND D339— LATEST EXAMPLES OF CATERPILLAR LEADERSHIP IN ACTION

PUBLIC
WORKS
MAGAZINE
JULY
1955



● GENERAL ARRANGEMENT of heating tank used at the Philadelphia NE plant.

HIGH SPEED SLUDGE HEATING

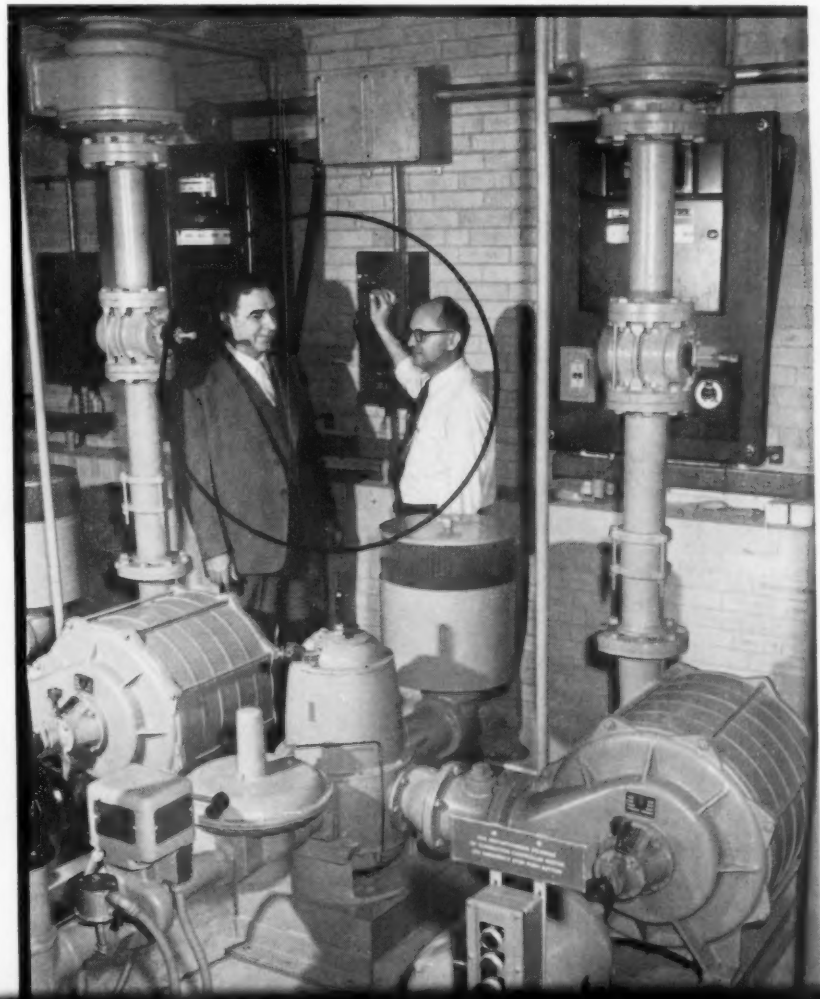
A. A. FURCZYK, Chief Development Engineer, Selas Corporation of America

MAINTAINING the correct conditions for sludge digestion is often a difficult problem in sewage disposal. A recently developed sludge heating arrangement, proved by more than two years of continuous operation, simplifies the entire digestion process. Under this system, direct heating brings the temperature of primary sludge up to the optimum level for charging into the digester. Sewage gas is burned in a specially-designed combustion chamber, and the heated combustion products are diffused into the sludge in a small heating tank. No additional heating is necessary to keep the digester operating at a proper temperture.

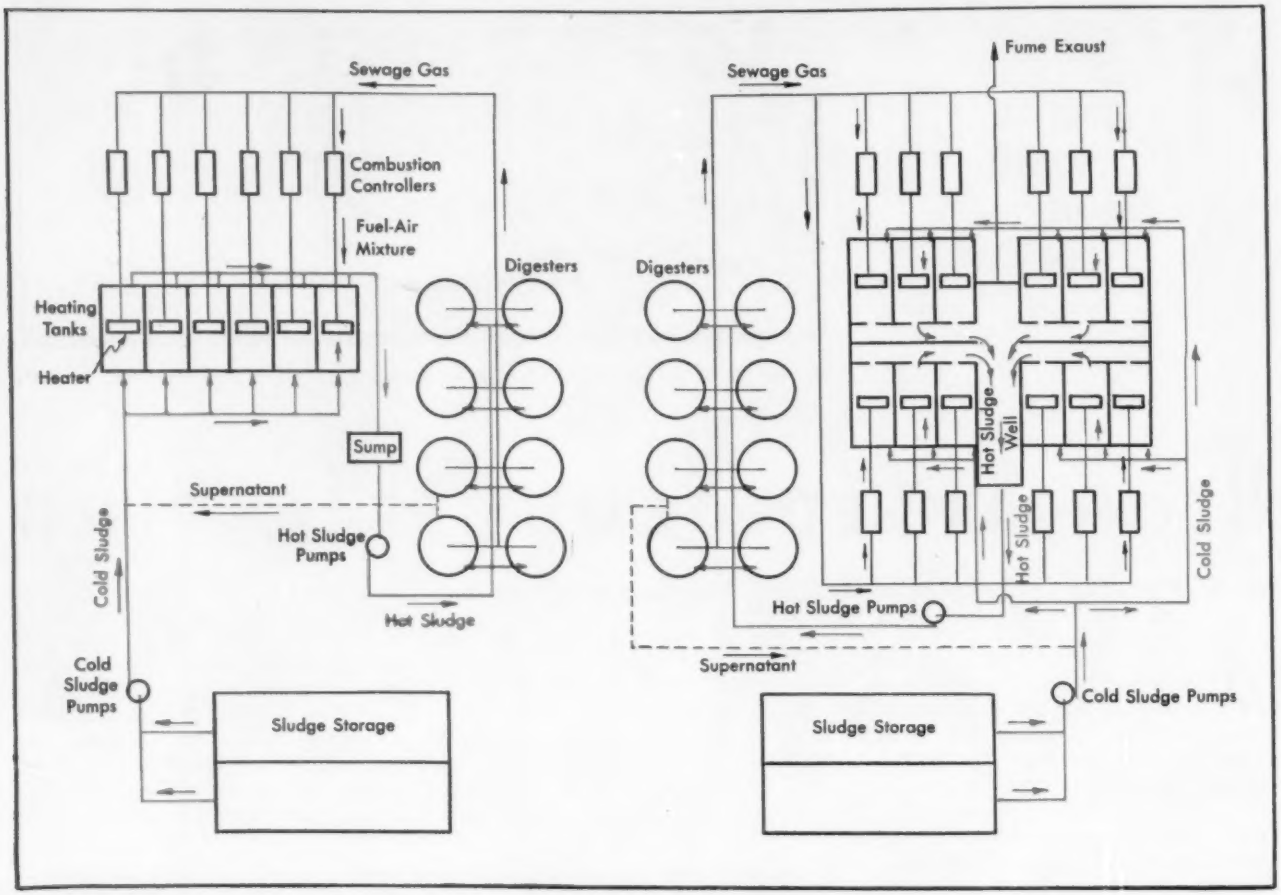
Experience at the Northeast Sewage Disposal Plant, in Philadelphia, proves that direct heating with sewage gas produces a high thermal efficiency and simple temperature controls, coupled with low maintenance requirements. Of equal importance is the superior sludge digestion that results, as shown by high rate of gas production. These excellent records have led the Philadelphia Water Department to install similar sludge heating units in the new Southwest plant, just recently placed in operation.

Heating a digester of any practical size is a clumsy operation. The slow transfer of heat makes close control of the temperature very difficult. Where temperatures above 135°F are used in the heating medium, heavy sludge cake may form. Corrosion may be another problem.

To solve their heating problems, engineers of the Philadephia Water Department and Department of Public Works investigated the possibilities of replacing heating coil systems with the more direct method of submerged combustion. The principle here is to place the hot combustion products in direct contact with the material to be heated. A satisfactory and flexible heating system was found in the Superheat



● AUTHOR looks on as Ralph Hoot, chief of Philadelphia's sewage treatment section, activates Selas sludge heaters at the new Southwest plant.



● **FLOW CHARTS compare sludge heating layouts of Philadelphia's Northeast Disposal Plant (left) and the Southwest Plant.**

burner design developed by the Selas Corporation of America. Although new to the sewage disposal field, this burner has been used for many operations in metal-working and other industries. For sludge heating, it was proposed to release the hot combustion products into a tank through which the sludge was to be pumped between storage tanks and the digester.

The Northeast Treatment Plant has operated the sludge heating system for more than two years. Sludge is drawn from storage and pumped to a battery of seven heating tanks. Some supernatant, withdrawn from the digesters, is added to bring the mixture to a suitable consistency. Sewage gas is drawn from the digesters and fed to combustion control equipment, where it is carefully proportioned with air. The gas-air mixture is fed to a small, ceramic-lined combustion chamber, known as a Superheat burner. The fuel is completely burned within this chamber, which is actually a miniature furnace. Some measure of the unusual efficiency of the burner can be deduced from the fact that this equipment can liberate 45 million BTU per hour per cubic foot of combustion space. The burners in use at Philadelphia are rated at 2.3 million BTU per hour each.

The hot gases that result from this combustion are directed down through a boot and released at a velocity of up to 30 feet per second, and a temperature of about 2,400°F, into the moving sludge. The gases agitate the sludge violently, thoroughly mixing the sludge, and transferring nearly all of their heat. The spent gases are vented at a stack temperature of only 125°.

These figures represent a very rapid exchange of large amounts of heat. One of the greatest advantages to such heating is the accurate temperature control possible. Any adjustment of the flow of the fuel-air mixture causes instant response at the burner, and a corresponding change in temperature in the sludge without significant delay. Such an adjustment does not affect the fuel-air ratio, which the combustion controller maintains over a wide range of flow volumes. Further control of heating is possible through adjusting the rate of flow of the sludge through the heating tank.

The heated sludge is piped to a common sump, and pumped to the digesters at a temperature of 110°F. About 300,000 gallons are thus heated each day.

The sludge drawn from storage varies in temperature from 50° to 75°. This variation in heat requirement is handled by using from two to five of the seven heating tanks. Thus, even at peak loads, two tanks are shut down daily for cleaning, while still more reserve capacity is available in warmer weather for overhaul and other purposes.

Maintenance is Simple

Maintenance has proved extremely simple. With the burner off and lifted out of the tank, and with the sludge flow diverted, the tank is quickly and easily cleaned. What little material may have hardened about the tank walls is easily removed. There is no corrosion problem, since no tank parts are corrodible.

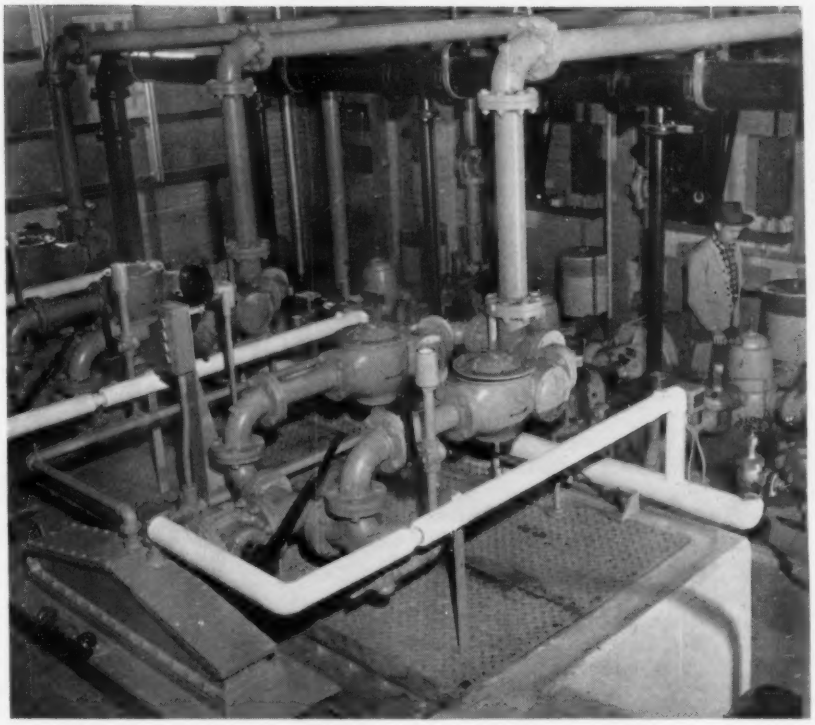
Costs have been kept low by this small maintenance requirement, and by the efficient use of sewage gas. The overall thermal efficiency, calculated by plotting the rates of gas and sludge flow against the temperature rise in the sludge, is 85 percent to 90 percent.

More important even than these considerations is the excellent operation of the digesters. Digestion temperatures have remained between 95° and 100°F throughout the year. Although the exact relationship between gas production and digester temperature has not yet been established, the staff at Northeast give much credit for the excellent digestion, as shown by high gas production, to the sludge heating design; and gas production there has reached 12 cubic feet for each pound of sludge.

Only a small proportion of this gas is needed for sludge heating. Some is used for space heating at the disposal plant, and the rest is vented and flared. Other uses for the surplus gas, such as incineration of the disgested sludge, are now being considered.

This sludge preheating system has proved so successful over the past two years at Philadelphia Northeast, that the Water Department has installed the same arrangement, with only minor changes, in the new Philadelphia Southwest Sewage Disposal Plant. The new plant will handle digestion of the sludge of more than 2/3 of Philadelphia's sewage; this is expected to mean the heating of 840,000 gallons of sludge per day, serving some 2 million persons.

To meet this load, 12 heating tanks have been installed. They are arranged in four batteries of three tanks each to allow greater operating flexibility. Piping has been eliminated at the discharge end of these tanks and simplified elsewhere. Heated sludge flows over weirs into concrete channels, the sludge from all three tanks in each battery flowing into a common sump. Channels and sump are entirely enclosed, and all gases are exhausted by a fan.

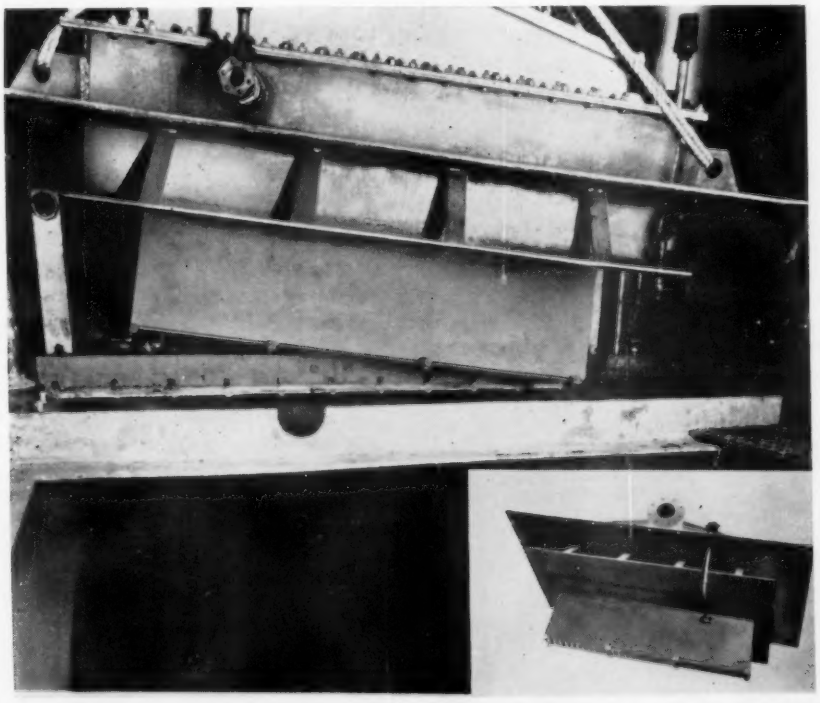


● **WORKER at right adjusts the fuel/air mixture. Heating tanks are in the foreground, with the burner top visible at the extreme lower left of the illustration.**

Another change designed to increase operating convenience is a new placement of the combustion controllers. At Northwest, the combustion controllers and the burners were located in different rooms, on either side of a common wall. To put the entire sludge heating installation in a single room, the combustion controllers at Southwest are directly behind the burners. The basic design of the sludge heater, however, is unchanged.

Other cities are also installing the Selas radiation burner units for sludge heating. A variety of sizes is available for this purpose: while the Philadelphia units have a rated capacity (each) of 2,300,000 BTU/hr, 1,000,000 BTU/hr units are in use in Erie, Pa.; 750,000 BTU/hr units in Cleveland, Tenn., and Columbus, Ohio; and 250,000 BTU/hr units in College Place, Wash.

The sludge heating installations outside of Philadelphia were manufactured as package assemblies by the Chicago Pump Co. Each package includes Selas combustion controller and burner, together with heating tank and associated control equipment and plumbing, ready to be mounted on or near a digester.

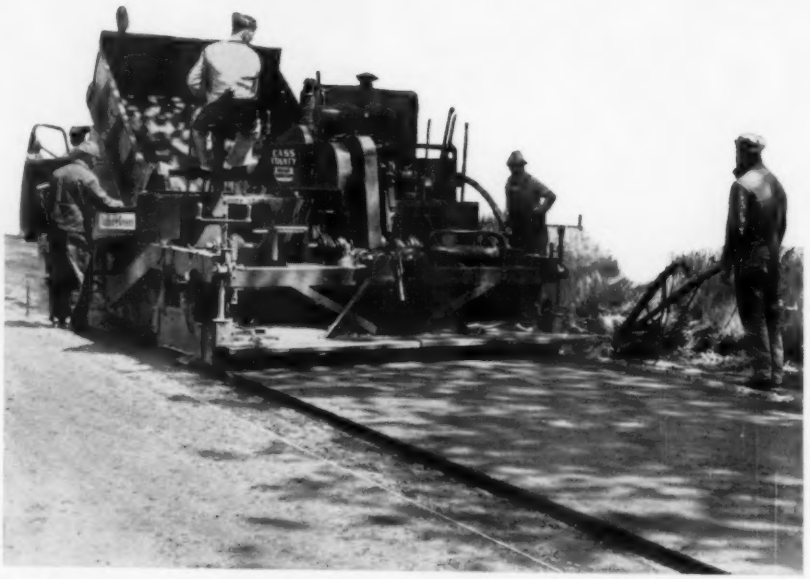


● **INSTALLING a Selas burner unit in a sludge heating tank. Inset at lower right shows arrangement of slots in diffuser boot through which hot gases are released.**

SAVINGS

Will soon PAY for our

ASPHALT EQUIPMENT



● "GREEN" crew operates the county Barber-Greene finisher on the initial job. Results were highly satisfactory and worthy of trained and experienced operators.

ROBERT J. ROBILLARD,

Engineer-Manager, County Road Commission, Cass County, Michigan

LAST year, 1954, the Cass County Highway Commission undertook its own hot-mix paving operations. While we had produced our own cold road-mix, by blading the oil and aggregate together in conventional fashion, our hot-mix bituminous work had been let to contract. We did, however, provide the material and do the base preparation work.

As we enter our second season, we still have a lot to learn; and we know it. But there are several things on the favorable side of the ledger, too. For one thing, we saved over $2.00 per ton on 41,000 tons of black-top material we put down on 32 miles of county and township roads in 1954. That $80,000 plus, will more than pay for our plant, our paving machine and the plant accessory equipment. The Michigan State Highway Dept. tells us to look for a life of at least eight years in heavy construction equipment. Actually, our system of maintenance should insure many more years of useful life than that, so it is easy to see why we expect to recover our equipment investment many times over.

For another thing, we have learned that the "mystery" of asphalt paving is easily dispelled and that basically, it is a very simple operation. We began with a green crew and with reasonably green supervision. The constantly decreasing cost per ton, and the increasing efficiency of operation of our crew proved to us that it is entirely feasible and practical for a county of our size to own and operate its own paving equipment.

I suppose that every County Engineer who considers putting his county in the paving business meets with a greater or lesser degree of resistance from the contractors in his area. I'm certainly no exception to that; but the factors seemed to be all in favor of the move our Commission elected to take.

For one thing, we are a reasonably rural county. Our county has a population of only about 22,000; we have but two cities with populations in excess of 1,500 and our largest city has only 6,000. We have many resort lakes in the county and many small townships where a mile or two of road is a big resurfacing program. Contractors are not interested in such small jobs and their fixed costs of operation, regardless of job size, skyrockets the costs per ton, or per mile, on projects of this size. Naturally, no governmental body should operate in competition to private endeavor, but with the multi-billion dollar Federal road program in the offing, plus increased allotments from the States and a virtual "rash" of tollroad programs, rural counties may soon find that their needs will be in the low priority bracket.

These are the reasons that prompted our decision to do our own paving work, and these are the results of our first year's operation:

The First Year

We investigated several types of mixing and paving equipment, purchasing a Barber-Greene Model 848 single aggregate plant, because of its portability, its high capacity and the fact that our original equipment can be used in the production of higher-type multiple aggregate mixes at a later date if we so desire. We also purchased a Barber-Greene Model 879-A Finisher and the necessary auxiliary plant equipment, working through Miller Equipment Company of Grand Rapids.

There are twenty-eight gravel pits in Cass County, which we own. Not all of these are suitable for asphalt work either because of gradation, or because of a high percentage of clay present in the aggregate. We oper-

ate our own crushing plant and decided to put both the crusher and the asphalt plant in the same pit. This eliminated a problem of haulage and stockpiling. Not having large stockpiles exposed to the weather, we kept our moisture content down and this, in turn, kept our plant capacity up.

All-in-all, during the 1954 season, we worked on 14 separate county or local roads, moving the whole plant and crusher set-up three times. We began our operations on May 20th in a pit about three miles east of Cassopolis, the county seat. Between then and June 15th, we turned out 10,000 tons of mix. By the time our first job was completed, our new Cleaver-Brooks boiler unit was ready for operation. We have mounted it on an old truck chassis so that it can be transported right along with all of the other plant equipment.

Under the direction of our veteran Road Superintendent, George Smith, our crew shifted the plant about fourteen miles to a new site near Marcellus. We went back into operation June 21st and by July 1st had produced 6,600 tons.

The third move involved a trip of some twenty - seven miles to Edwardsburg. By July 9th the plant was running and turned out over 14,600 tons between then and August 9th.

For our final move of the season, we trucked some seventeen miles, back to the Cassopolis area and between August 17th and September 4th the plant produced 9,400 tons. With our 1954 program completed, we shut down for the winter, although the unusually warm fall and winter we experienced would have let us work much longer.

The tonnages I have quoted have been "rounded-off". Actually, we turned out nearly 41,000 tons at an average rate of 75.2 tons per hour. Users of the Model 848 mixer will recognize this as being a production figure well below the capacity of the plant. However, I would like to point out that we had established this level as being adequate for our needs. Accordingly, the manufacturer and their representatives recommended that we use the Model 835 Dryer, which is normally used in their 60- to 90-ton per hour plant set. This recommendation lowered our initial equipment investment and still left us with a plant, the capacity of which may be increased as our needs may demand.

I feel that I should pay tribute to our plant crew for the manner in which they quickly learned not only the plant operation, but its transportation as well. Regardless of the number of calendar days between jobs, it actually took only three days from the time the plant stopped operation at one job, until it was moved, in place and ready to operate at the next. Many things have contributed to this.

For one, we have carefully measured and noted the exact locations of each piece of plant equipment. At a new location, a dozer levels the area needed and we can put the equipment in place the same, each time. Even our plank footings and the asphalt and steam piping are cut to measure and reused on each job.

Our asphalt suppliers, the South Shore Service Company, too, have aided our portability in that they provide the asphalt in heated trailers ready to pump into the mixer's surge tank. This makes it unnecessary for us to carry storage tanks and transfer pumps with us.

Cost Data

As to cost, I would like to cite two sets of figures which show both the increasing degree of efficiency with which our crew was able to operate as the season wore on, and also the comparison in per-ton costs which accounted for the saving in this one year, above and beyond the cost of our equipment.

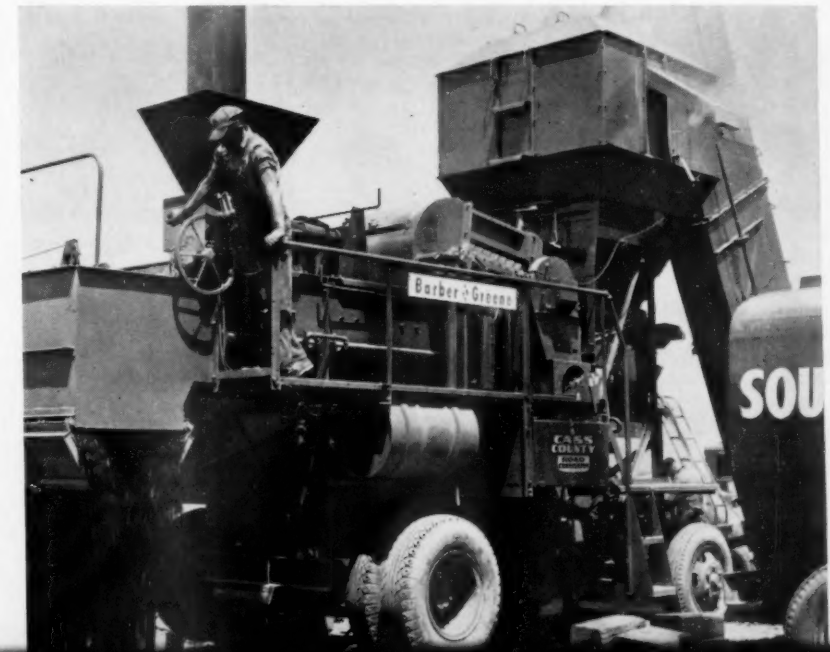
During our first four days of operation—May 20-24, 1954—we paved a two-mile section of County Road #665. As was the case on all of our 1954 jobs, we were resurfacing an existing gravel road. Some base reshaping had to be accomplished, some gravel patching had to be done, and a prime coat was applied before paving. These are our costs on this job, which totalled 2,114 tons of mix. Labor, $1,183.33; materials (including prime oil, asphalt and diesel engine fuel), $4962.61; rental (based on State Highway Department rates), $3101.06; and aggregate (gravel), $1142.60. This totalled $10,389.60 or $4.91 per ton.

Between August 24 and 31 we paved another, virtually identical, 2-mile road near Dewey Lake. Here are our costs on that job: Labor, $1902.09; rental, $3970.14; material, $4015.55; and aggregate, $1045.86. The total here was $10,933.58.

So this two mile job cost more than the other one? Yes, but not on a per-ton basis. On the second job, we placed 3,054 tons of material as against 2,114 tons on the first. The reason for our going to a thicker mat was this. In checking some of the early jobs we were under the estimated cost per ton. We felt, therefore, that we could put on a thicker mat and still come out with a cost per mile as originally estimated. This extra tonnage brought our per ton costs down to $3.48!

Overall, for the whole 1954 season, our costs were $4.12 per ton and this figure included all the costs of base preparation and the mixing and placing of the bituminous material.

On the last previous hot mix laid, the contract price for bituminous mixing and laying was $3.10 per ton; and, in addition, we furnished all of the material used and also took care of the base prepara-



● **MIXER unit of Cass County plant. Asphalt was delivered in heated tank trucks, transferring direct to mixer.**

● ALL UNITS were cleaned and painted at the end of the working season. In the background is the new building being erected to house the equipment in the winter.

tion and hauling. The best comparison I can offer is that on a 2.6-mile stretch of local road, which was repaved with 3,150 tons of material, by contract, our total costs were $20,177.46 which averages out to $6.40 per ton.

The difference between this figure, which was typical for the work done in previous years under contract, and the $4.12 average cost per ton in our own 1954 season, makes us certain that we have paid for all of our equipment by its use in this one year.

Table 1—Aggregate Grading Specifications

Screen	Percent
¾	96.8
⅜	81.7
#10	55.7
#40	17.6
#80	—
#200	0.8
Asphalt	5.1

Our mix specifications were set up to meet the State Highway Department 4.09 specifications, taking advantage of existing materials. An extraction test on a typical job where we were using minus ¾-inch crusher run gravel, is as shown in Table 1.

Plans for 1955

In our 1954 operations we used an SC-4 asphalt. We felt that with our inexperience we needed a slow-setting binder that would let us correct any mistakes we might make at the lay-down end of the job. Actually, we encountered no serious errors and in 1955 I intend to investigate other grades of asphalt.

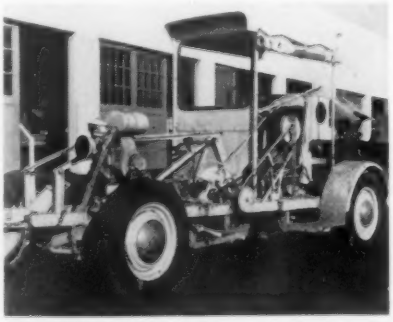
The paving, as mentioned earlier, is handled with the Barber-Greene finisher and final compaction is obtained with a Galion tandem steel wheel roller.

Earlier in this story, I mentioned our "system of maintenance" and the fact that it insured many years of useful life from our equipment. We feel that we leave nothing undone at the end of a season with our equipment. It is thoroughly cleaned with steam and solvents, then completely repainted and, if at all possible, is then stored inside until the following season. We have just completed the construction of a 40 x 100-ft. building which will entirely enclose our paving and mixing equipment during the off-season. This kind of maintenance means fewer repairs, longer life and better trade-in value.

Sweeper Cleans Highway Markings Before Repainting

THE California Division of Highways recently perfected a "line sweeper", a traveling brush arrangement which cleans highway painted stripes just a jump ahead of the paint-gun carriage with which it is jointly housed. The combination was designed and built by California highway engineers in their own shops. The sweeper attachment, mounted immediately ahead of the paint-gun assembly, consists of a gang of six 10-inch-diameter brushes, each two inches wide, turning on a single shaft which revolves at about 250 rpm. Power is furnished by a Kohler K-90-RT engine, equipped with retractable starter and gear reduction unit.

Like many other states, California maintains paint and glass-bead stripes to channel traffic into proper lanes and to assist motorists in fog and darkness. Laying down these stripes requires firm bonding with the pavement which must be clean, dry and free of all loose particles. Mechanical cleaning with a engine-driven wire brush has been found most effective and economical. This system is not yet in use on a large percentage of the state's mileage, but it has proved helpful on stretches where conditions warrant its use, according to Earl E. Sorenson, equipment engineer of the California system.



● THIS is the rig used by California Division of Highways to clean and paint highway marking stripes.

• • •

Cost of Refuse Collection and Disposal

The cost of refuse collection and burning in Cuyahoga Falls, Ohio, was $10.26 per ton, a total of $99,-499.98 for the 9,732.3 tons collected. The cost of collection was $64,481.89 or $6.62 per ton. Incinerator operation was at the rate of 3.79 tons per hour.

Use of Sodium Arsenite for Controlling Aquatic Plant Growths

A Letter From
JOHN L. FARLEY,
Director, Fish and Wildlife Service
Department of the Interior

IN reply to your letter requesting our views on the use of sodium arsenite as a herbicide for controlling aquatic plant growths, the Service has found this chemical effective in the control of submersed plants and safe to handle if precautions are used. Its use by the Service, however, has been primarily restricted to the control of aquatic weeds in such waters as fish hatchery ponds and small artificial ponds on farms. It is often used for control of weeds in municipal parks, boat channels, and along bathing beaches. The policy of the Service towards the application of sodium arsenite is to discourage its use in the larger isolated water areas which produce essential plant food for migratory waterfowl and where its use would result in an undesirable upset in the ecological balance of conditions so important in the maintenance of habitat for waterfowl and other wildlife.

In water where the use of sodium arsenite is advisable, its application during warm summer months at the rate of 4.0 parts per million will kill dense growths of submersed aquatic plants in both hard and soft water and 2.5 parts per million will generally give good results if the weeds are not too dense. Four parts per million are equivalent to 1 gallon of the liquid form of sodium arsenite in 16,020 cubic feet of water and 2.5 parts per million are equivalent to 1 gallon of the liquid form in 25,632 cubic feet of water.

The powder sodium arsenite is used at the same rate, but 21.2 pounds (75 percent as As_2O_3) are required to yield 4.0 parts per million in 64,080 cubic feet of water and 13.0 pounds to yield 2.5 parts per million. If the powder form is used, it should be thoroughly dissolved before introduction into spray tanks to prevent the heavy material from settling and not being dispersed. The more dilute the solution, either with the powdered or liquid form of sodium arsenite, the better the coverage will be.

The lethal effects of sodium arsenite on most species of aquatic plants are rather temporary and may persist only through one season, as viable seeds and other propagules may remain in the bottom soil ready to initiate a new growth after the effects of the sodium arsenite have been dissipated. Furthermore, the same sources from which the initial invasions arose probably continue to exist. The eradication of one season's growth, therefore, does not signify the complete solution of an aquatic weed control problem, which demands periodic attention.

Sodium arsenite is a poison and should be carefully handled. The spray operator should wear goggles to protect the eyes and rubber gloves to prevent skin burn or entry of the solution into open cuts. Protective clothing should be worn and washed thoroughly with soap and water before re-use. Children and animals should not have access either to the chemical or to emptied containers. Cattle and other grazing animals should be excluded from the water as well as the immediate shoreline area, as stock may drink the water and eat enough of the salty plants to be poisoned. In any case, the treated water should not be used for bathing, watering lawns or animals, or for any other domestic purpose until 3 days have elapsed following treatment.

In applying sodium arsenite to a water area it is practically impossible to prevent the solution from coming into contact with some of the shoreline vegetation, so care should be used to guard against damage to trees, shrubs, and other desirable plants. Some land plants are very sensitive to arsenic.

Sodium arsenite has, on the other hand, a wide margin of safety as a hazard to fish. The dosage required for lethal effects on fish is 11.0 to 12.0 parts per million, far in excess of the concentrations necessary to kill aquatic plants. While fish may temporarily retreat from a sprayed area, they will soon return. If the maintenance of a fish population is desired, it is advisable to leave a part of the plant growth unsprayed to serve as cover and as habitat for fish food organisms.

DESIGN for a

GUY BROWNING ARTHUR

THE CARE exercised by consulting engineers in planning small water and sewage plants is a credit to the profession. The small plant does not have magnitude, and is rarely as spectacular as a big plant, but, is just as important to the small community as the big plant is to a metropolis. The painstaking analysis of conditions in Gainesville, Georgia, insured a design which satisfies present demands, and looks well into the future.

There was an old plant, built in 1936, with a capacity of 2 MGD, located at the junction of two creeks emptying into the Chattahoochee River. A clearwell stored 480,000 gallons, which were pumped into the mains against a head of about 500 feet. Two elevated tanks of 200,000 and 300,000 gallons capacity are located near the city limits.

This plant stood within the lines drawn by the Corps of Engineers for Buford Dam, an important structure being built for control of flood water. The old plant could have been made larger, with a dike around it; but it was abandoned in favor of an entirely new plant built on high ground beyond the water line of the dam. The choice of alternatives was made easy by selling the old plant to the Corps of Engineers for $300,000, a comfortable beginning in financing the new plant.

In May, 1952, Robert and Company Associates, consulting engineers and architects in Atlanta, made a report on conditions affecting the old plant and the construction of a new one, estimating the costs. It is this study, advancing logically from one conclusion to another, that determined the location and design of the new plant.

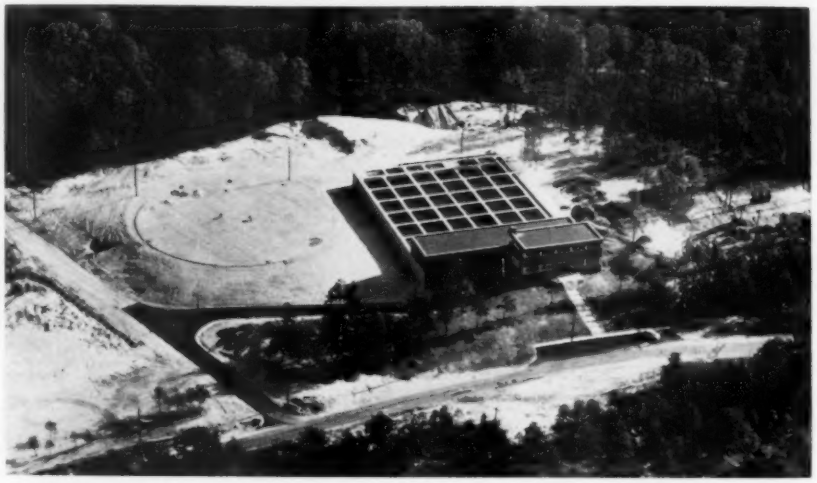
Few cities have been examined as critically. In a study of a large city there is room for errors. When dealing with the probable growth of a smaller place—12,000 population in Gainesville—estimating annual increments based on the prosperity of industries and farming, there isn't any room for errors. Any guess about next year's increase has to be good.

To find a safe trend for estimating population, the increases in four other cities in Georgia were plotted with that of Gainesville. The other four cities are larger, but with about the same growing conditions. All five have records from 1860. At that time Gainesville had 344 persons, and the largest of the five had 4,010. Something was known of the reasons for growth in each place, especially the new textile mills started in the last thirty years.

Then a basis for a hypothetical trend was worked out. The curve for Gainesville was drawn on a graph. Curves for the other four places were then applied to the Gainesville curve—using only that portion of each of the others that rose above Gainesville in the 1950 census. Then the true Gainesville curve, stepped up by the influence of growth in the other four cities, became a line on the chart which seemed to be a safe guide for forecasting growth to 1970.

In addition, another study was made for "Greater Gainesville." The city water lines are already hooked up with three neighboring textile villages for emergency needs, and this may be assumed to indicate an extension of the city limits at some time. Some areas around the fringes of the city already have water service, and about 20 percent of the 4010 active water accounts are beyond the limits. To be realistic, as the engineers' report points out, a new water supply will have to serve total population regardless of city extensions.

From the curve developed on the chart the population to be served in 1970 will be nearly 30,000. This gives one figure for getting at the



● **AIR VIEW of the Gainesville, Georgia, water plant shows compact arrangement of the administration building, settling basins and filter building. Ground-level clearwell may be seen at left. Picture was made before landscaping was completed.**

● **ATTRACTIVE interior of the filtration building as it appears from the operating floor. Each of the three filters is a double unit, with 18' x 20' compartments.**

SMALL WATER PLANT

● **MATERIAL HANDLING received special attention in the design of the plant. All trucks come in on this service road and unload at the level of the basement floor. Chemicals are lifted by elevator for storage on the second floor of the building.**

amount of water to be supplied. From the records of the old plant the average daily use was 115 gallons per person, or, by another calculation, about 470 gallons per meter.

At present the family unit in Georgia consists of 3.6 persons, so the 1970 population will have 8,250 family units. If each one has metered service there will be that many meters. Services to commercial places will take up any meters not used by the family units.

Meterage and Consumption

About 240 meters are being added each year. In the next 18 years these will total about 4,320, and these, added to the 4,000 now in use, will bring the total to 8,320. This is close enough to the 8,250 forecast in the other calculation.

The old record average of 115 gallons per person indicates a daily demand in 1970 of 3.37 MG. Using the other figure, 470 gallons per meter, the demand will be 3.91 MGD. The maximum demand from the old plant was only 134 percent of the average, but inquiries led the engineers to believe that this was low because the plant could not produce the water. Therefore 150 percent of the average seemed to be safer for determining maximum demand in the design. Thus the maximum daily demand for the new plant must be calculated at 150 percent of 3.37 or 3.91 MGD, which results in 4.75 to 5.5 MGD.

So the new plant is designed to produce 4 MGD at present, with tie-ins for increasing to 6 MGD when that amount is needed.

When this conclusion was accepted, the city purchased a site near the present city property, on high ground well above the reservoir surface, and just outside the taking line. The supply line from the river intake is about one quarter of a mile long.

Intake—An intake tower was built on the Chattahoochee River, 12 ft. inside diameter and 80 ft. high above normal river level, or 5 ft. above the future lake level. Since the lowest river stage is at Elevation 1030, the first gate in the tower must be at that level. Two other gates are provided between that one and the highest one, which is at El. 1075. There will be seasonal variations in the level of the reservoir, so four gates are well chosen. Also, there will be variations in the quality of the water in different strata, and the four gates will permit of taking water at the best level for economical treatment. Bar screens on the gates prevent the entrance of debris.

Filtration Plant—The layout of the filtration plant is conventional. While it is plainly designed for maximum efficiency, the appearance of the administration building and the outside units is very pleasing.

Raw water comes from the intake pumps through a 20 in. main, and flows into a mixing chamber in the administration building. This chamber is stepped in three sections, with baffles to insure thorough mixing. One of the chemicals—lime, alum, chlorine—is introduced at each of these steps. The Wallace & Tiernan feeders stand just outside the mixing chamber.

From here the water enters the long flume which carries it to the flocculating tanks at the far side of the layout. There are three of these tanks, two of which are in use and equipped with Chain-Belt mixing units. The tanks are 13 ft. wide, extending across the ends of the settling basins. The detention time is to be 30 minutes, producing a capacity of 2 MGD in each unit.

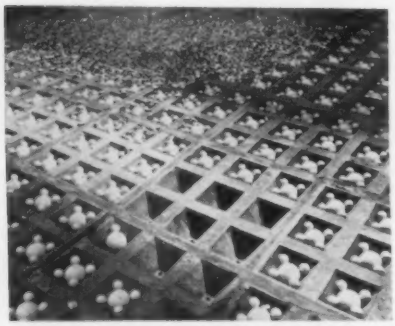
The two settling tanks are each 86 ft. long, and about 20 ft. wide. A detention period of 6 hours at the normal 2 MGD capacity for each tank is provided.

Until the dam is filled, water from the river may be high in turbidity. At the DeKalb County intake, some distance farther south on the river, turbidity runs as high as 2500 ppm. Once the operation at Gainesville becomes normal, with water from the reservoir, the turbidity should be low. Enough settling will take place in the reservoir to reduce sludge to a minimum in this plant. It is thought that the settling basins will have to be hosed out every three months. Sludge will be wasted to the river.

Filtration

From the settling basins the water flows over angle-iron weirs to the filters. There are three double filter basins, one not yet in use, each half 18 x 20 ft., with a surface area of 360 sq. ft. Wash water troughs are spaced 5 ft. on centers. The Wheeler bottoms are covered with gravel in three graded sizes, topped with 30 ins. of uniform sand. Each double unit is expected to filter 2 MGD with a flow of 2 GPM per square foot. They will be washed back when there is a loss of 8 ft. in head, or after 100 hours of service.

Filtered water flows by gravity into the clearwell, which is a concrete structure 151 ft. in diameter and 15 ft. deep, with a capacity of two million gallons. The concrete roof stands just above ground. This is an unusually fine concrete job, made watertight by mixing three parts of standard Portland cement



● **SECTION of the Wheeler filter bottoms shows placement of spheres and covering with gravel in layers.**

with one part of Magnolia. Lime and fluoride are added to the filtered water entering the clearwell.

One Venturi meter 20 ins. in diameter is installed to measure the raw water, and another, 24 ins. in dia., for the finished water going to the mains. Service pumps to the mains include two Peerless 4-MGD units, single stage, horizontal centrifugal, powered with 300 HP, 2300 volt motors. The standby is the same size, driven by a LeRoi gasoline engine. A single pump, 7200-GPM capacity, single stage, horizontal centrifugal, supplies wash water. It is powered with a 100 HP motor. Bristol gauges are used for the clearwell and distribution pressure. Simplex meters measure the raw and finished water.

Chemicals are stored on the second floor of the administration building, and are carried up on a Rotary Oildraulic elevator made by Rotary Lift Company. This unit is notable for its safety features, with interlocking door and starter connections, admirably suited to a place where rough materials are handled by common labor.

The laboratory will test daily for bacteria, alkalinity, iron, manganese and fluoride. Copies of all reports will be filed with the city and the state.

Cost of the Plant

For the equipment and piping the city furnished materials costing $143,847. The Murphey Equipment Company, of Decatur, Georgia, supplied other materials costing $107,966, making a total of $251,814. For the structures the city supplied materials worth $105,482. Labor and materials by the Fiske-Carter Construction Company, of Spartanburg, South Carolina, for the intake, mixing and settling basins, filters and clearwell, amounted to $344,703. The total cost of structures was $481,355. The finished plant cost $733,169.69. It was financed in part by the sale of the old plant for $300,000. The remainder was raised by issuing Water Revenue Certificates.

Personnel—J. Moran Roberts was actively in charge of the project for Robert and Company Associates. The resident engineer was C. G. Trowbridge. H. L. Dooley is superintendent of water and sewers in Gainesville, and J. E. Robertson will operate the new plant. He was in charge of the old plant, and has had 20 years of service in the city.

● **INTAKE TOWER is equipped with four gates to allow water inlet from different strata. Top of the 80-foot high tower is 5 feet above the future level of the lake.**

Most Useful Equipment Reported by Water Departments

ON A RECENT questionnaire, the editor of Public Works asked the men in responsible charge of Water Departments in some 750 cities: "What is your most useful equipment?" Here are the answers:

Air compressors	**272**	**Ditching machines**	**32**
Trenching machines	**254**	**Generators**	**24**
Pumps	**175**	**Mobile and 2-way radio**	**22**
Tapping machines	**125**	**Gate valve machines**	**22**
Pipe and leak locators	**92**	**Sewer cleaning machines**	**20**
Pipe pusher	**71**	**Meter testing equipment**	**17**
Bulldozers	**49**	**Power shovels**	**14**
Graders	**34**	**Welding gear**	**14**

ROCK SALT STABILIZATION
KEEPS OUR ROADS IN SHAPE

ROBERT T. CARRIER,
County Highway Superintendent
Genesee Co., N. Y.

OUR ROAD problems in Genesee County are typical of those faced by many other counties with which I am familiar. Our county system is comprised of presently good roads, of outdated roads carrying heavy traffic, and of gravel roads. Traffic volume and weight are increasing on all of these roads. Part of this is due to our location in the northwestern part of New York State between Buffalo and Rochester. Another typical contributing factor is our system of seven centralized schools. Besides our normally increasing traffic burden, our public demand for better roads is being strengthened by such new factors as a system of county mutual aid fire departments.

Our answer to these demands for better roads can be only this: We must maintain our present good roads, we must bring our outdated and heavily travelled roads up to date, and we must maintain and improve our gravel roads—all within the limited funds available to us. Confronted with this situation, it is obvious that we should be looking for areas in which we can save money without compromising quality.

In the last few years, we have found that economical rock salt stabilization allows us to maintain our gravel roads with a minimum of work and expenditure. In fact, because of savings realized on these stabilized roads, we are now holding our own on our overall road program and eventually we will get the roads that our modern traffic conditions require.

With rock salt stabilization, we have found that we get a good job at a very reasonable cost. We believe that rock salt, in fact, can be used in almost any way with nothing but benefit, although the more controls used and the better the technique, the better the results. Since 1950, we have stabilized all of our gravel roads with rock salt. When we started this during the late forties as a dust control project, we had long been familiar with rock salt for ice control. Step by step, we progressed from rock salt for dust control to regular rock salt stabilization and a point where we know what we are doing and know the many advantages it gives us. Eventually, we will black-top our stabilized gravel roads. The salt stabilized road provides the best type of base to carry the increasing traffic burdens; and in the meantime keeps them in condition during all seasons with a minimum of maintenance.

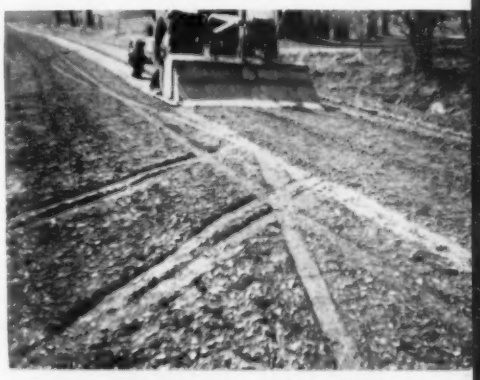
Having put in many miles of salt stabilized gravel roads, this season we are going to expand our stabilization program to include shoulders. This should make available to us more funds with which to make permanent road improvements and the stabilized shoulders should add to highway safety.

It is interesting to note that all of the 13 towns in Genesee County have followed our lead and now stabilize with rock salt and plan to continue with it. Although we worked fairly closely with these towns in the beginning, they now work on their own, contacting us only occasionally for technical information, and now and then for the loan of a piece of equipment. As they too branch out to shoulder and base stabilization, they will acquire the few pieces of equipment necessary to salt stabilize their roads most efficiently.

Rock salt stabilization can be successfully undertaken if you have a means of scarifying, blading, watering and rolling. We use the following equipment for salt stabilization: one Seaman Pulvi-Mixer, self-propelled; two Austin-Western Graders (one Model 99H and one Model 99 Master); one 13-wheel pneumatic roller; one Austin-Western 3-wheel 12-ton steel roller; one Cedar Rapids Pit-Master crusher; one BMCO Rock Buster and Crusher; one 2000-gallon water tank, trailer type and home made; and several Brockway 10-ton trucks equipped with Flink tailgate spreaders for spreading salt.

We pick up rock salt with our own trucks from the Retsof Mine of the International Salt Company, about 20 miles away. We store the rock salt in an outside pile at our County Garage and usually have on hand about 200 tons in the summer and 1000 tons during the winter.

● **GRADER** shapes road surface in preparation for rock salt stabilization.



● **MECHANICAL** mixing blends salt with crushed gravel and native soil.

● **PNEUMATIC** roller compacts full depth, leaves almost smooth surface.

● **TO BLEND materials on salt-stabilized road the mixer first travels diagonally back and forth across the entire road width and follows with two straight passes.**

This same salt, of course, is used for ice control.

Let me detail one project. By doing this, I think that I can best explain some of our feelings about rock salt stabilization, and also provide a step-by-step case history for those who have not yet put in rock salt projects. It should also be of interest to those who are regular users of rock salt for stabilization and want to compare our techniques and costs with theirs.

The project, constructed in April, 1954, was a 4½-mile section of County Road 39 (Cook Road). This 18-ft. wide road has a traffic count of about 250 vehicles a day. Part of this traffic is made up of trucks of 20 tons gross weight using a gravel pit on the road. The rest of it is composed of school buses, farm and milk trucks, and normal rural traffic.

Before salt stabilizing this section, we had usually had to blade it eight or nine times a season. Over the previous ten-year period, the road had lost about eight inches of gravel. We brought in crushed gravel to replace that lost and salt stabilized the top 4 inches a few weeks later to consolidate the fines and prevent future loss of materials.

The gravel that we had brought in was from a fairly consistent pit which we had used many times for successful salt stabilization. Its gradation was good, and enough material passed a 200-mesh screen for good cementing action. In this locality, our limestone-type gravel has a certain amount of natural binding quality and seems just right for salt stabilization.

Keeping the road open to traffic during the entire construction period, we worked in one-mile sections, each of which was completed in one day. Our first step was to scarify to a depth of four inches and shape the road. The road already had good drainage, as essential to a salt road as to any other type. In shaping a gravel road which is to be salt stabilized, we use an "A" shaped crown rather than a rounded one. For the maximum wet season, our slope is one-half inch to the foot. With this slope and type of crown, we find that there is not so much chance of flattening at the center with eventual water collection and pot-holes.

We next spread rock salt by making two passes and distributed six tons to the mile as evenly as possible. Then our mechanical mixer was brought in and made one blending mix (by criss-crossing the entire road width) and two straight passes. During the blending, water was added as needed by our gravity flow tank. We find that water should be thoroughly mixed with all materials, but that it is not necessary to get the mix sloppy wet in order to get good stabilization. To get the water evenly distributed, we made one final pass with the mechanical mixer.

Our pneumatic wheeled roller, loaded with ballast to make a gross weight of about ten tons, then started its passes over the mix. In rock salt stabilization, we have found it best when compaction takes place from the bottom up. The pneumatic roller assures us that this will happen. Also, this roller seems to compact better because it exerts a vertical pressure on the mix with no push-out in front of it. The pneumatic rolling is considered completed when only almost imperceptible ridges are left on the surface.

After completing pneumatic rolling, we let each section cure for a day or two before doing final rolling with our 12-ton steel wheel roller. After this, the sections were so dense that it was impossible to dig into or scratch the surface with a tough stick. The surface was even and smooth, the fines in place and coarse aggregate held firmly. Although the road was completed as far as stabilization went, and dust was reduced by about 80 percent, on this project we went over the surface about two weeks later with an application of calcium chloride at the rate of about ¾ pound per square yard to better control the remaining dust during the dry season. We will continue this procedure.

How has this road stood up? Well, our eight and nine seasonal bladings have been eliminated. We did not touch this road until the fall, and then only once. In looking at the road a day ago, it has gone through its first winter very well. If previous experience with salt stabilization is a proper criterion, this road will continue to stand up under its considerable traffic volume and will require a minimum of maintenance, allowing us to devote our time and money to maintaining our presently good roads and to improving our out-dated ones before they completely deteriorate.

Our cost picture on this project is shown in Table 1. Labor and salt together total 1.23 cents a square yard, or $130.36 a mile and make up 30.64 percent of the total cost. Rock salt cost 11.7 percent of the total; calcium chloride 26.42 percent.

What other construction technique and material can produce such a good road and cost so little? And

(*Continued on page* 140)

Table 1—Cost of Building Salt Stabilized Road

	Sq. Yd.	*Mile*	*4.5 Miles*
Equipment rental*	$0.0173	$182.71	$822.20
Labor	.0076	80.59	362.65
Rock Salt**	.0047	49.77	224.00
Calcium Chloride***	.0106	112.44	506.00
Total	$0.0402	$425.51	$1,914.85

* Rental rates are based on those set by State Department of Public Works.

** 28 tons rock salt @ $8 at Retsof Mine. Hauling cost included in equipment rental and labor costs.

*** 14 tons calcium chloride @ $34± FOB Batavia.

Modern Water and Sewage Facilities for a thousand people

LESTER LEE, President, Hitchcock & Estabrook, Inc., Consulting Engineers

PUBLIC WATER supply and sewers and sewage treatment are often considered to be beyond the financial reach of a community of a thousand population. But New London, Minn., has shown that it is entirely possible for a small community to have these essential services.

After considerable discussion, the water supply project was brought up for vote. This was carried by a substantial majority, plans were prepared and the work placed under contract. The original contract provided for a 50,000-gallon Chicago Bridge & Iron Co. watersphere to be located on one of the highest hills in the village to insure adequate pressure, and for about 12,000 feet of 6-inch cast iron water main with 75 service connections.

The contract was hardly signed when petitions were presented to the council for additional mains and service connections. Those who had most actively opposed the project were found to be among the first to demand service. As a result, when the project was finally completed, late in the fall of 1954, more than 17,000 feet of main together with 220 service connections had been installed.

Water is obtained from an 8-inch well 160 feet deep located about a half-mile from the elevated tank. An electric control located at the tank operates the pump when the water in the tank falls below a certain level and shuts it off when the tank is full.

After the water system was under contract, public sentiment developed to such an extent that the council decided to install 3800 feet of sanitary sewers in the business district, including service to the school. This required the construction of a sewage treatment plant. Accordingly, engineering plans and specifications were prepared, bids were taken and contracts awarded for that work.

Work was started on all projects early in the summer of 1954 and completed late last fall.

The Crow River, which divides the Village, has a substantial minimum flow and for that reason the State Department of Health agreed to the installation of a plant which provides only primary treatment at this time; but the design is such that secondary treatment structures can be added without disturbing the present structures. The present plant includes a control building, which houses the sewage pumps, the chlorination equipment, a small pressure type water system and the sludge pump; also included is a wet well, a rectangular sedimentation tank, a digester and sludge beds.

Plant Design

The design flow of sewage, when the entire system is completed, will be 130,000 gallons per day. This flow is based on a population equivalent of 1,050 people using 100 gallons per capita per day plus 25,000 gallons per day infiltration.

The primary clarifier is 18 ft. long, 8 ft. wide and has a 7-ft. water depth. Overflow weirs are 16 ft. in length. This plant is designed to provide a settling time of about 1 hour and 20 minutes. The reduced settling time is in line with latest design and experience. The primary clarifier was set nearly on the surface of the original ground in order that sewage can flow by gravity through the completed plant. Earth fill was placed on a 4 to 1 slope on all sides of the clarifier.

The wet-well is 20 feet below ground surface and the pump room is, of course, at the same elevation. Walls were of reinforced concrete and it was necessary to use a double row of wellpoints spaced 18 inches on centers in order to dewater the area before placing the concrete. The finished structure is entirely dry even though it is located in a low, swampy area. One of the provisions in the specifications was to the effect that the project would not be accepted unless the pump room was completely dry.

The digester has an inside diameter of 25 ft. and a sidewater depth of 17 ft. It is of reinforced concrete with a fixed cover and is designed on the basis of about 8 cubic feet per capita.

Two sludge drying beds were provided, each 18 ft. 6 ins. x 37 ft. It

● **CONTROL building of the sewage treatment plant at New London, Minn., houses pumps and chlorinator.**

is realized that the sludge drying areas will be too small when the entire village is connected to the plant and at that time it will be necessary to provide additional sludge drying capacity.

Two raw sewage pumps were installed with provisions for a third pump at such time as it is needed. One of the pumps has a capacity of 150 gpm; the other has a capacity of 70 gpm. Pumps are controlled automatically so that at such time as the small pump will not handle the load, it shuts off and the larger pump goes into operation. In case the larger pump cannot handle the load, the smaller pump also goes back into operation automatically. The design of the entire plant is such that in case of power failure or other emergencies the plant will be entirely by-passed by gravity automatically.

The sewage plant is at quite a distance from the nearest water main and consequently a 4-inch screened well was installed for water supply in and around the plant. A small jet-type pump having a capacity of 15 gpm, complete with 50-gallon pressure tank and automatic controls is located in the pump room of the control building below the frost line. The total cost of this water system was found to be substantially less than the cost of running a water service line to the plant.

A Wallace & Tiernan Manual Type Chlorinator is installed in a separate room of the control building. Provision was made for two-point application of chlorine. Chlorine is fed to the wet well with the raw sewage and also to the treated effluent. The three raw sewage pumps are Fairbanks-Morse close coupled, non-clog, vertical type. General Electric timers are installed in each pump circuit which provides an accurate record of the time each pump operates. The primary clarifier is equipped with Chain-Belt sludge collecting equipment with manually operated scum removal pipe. The digester is unheated. It is equipped with Dorr draft tube mechanism. Sewage gas is wasted to the atmosphere through a flame trap at the digester.

Only one sludge pump is necessary. This is valved so that sludge can be pumped from the clarifier to the digester and from the digester to the sludge drying beds. This pump is by Carter and is of the plunger type, belt driven.

In laying the 10-inch extra heavy vitrified clay sewer outfall across the Crow River, well-points had to be used, as was the case in constructing the wet well. A by-pass channel was dug and, by employing well points, the sewer was laid in a dry trench.

Operation of the plant is on a part time basis by a village employee and a monthly report is given by him to the village council, showing time worked and general condition of the plant.

Financial Data

Barbarossa & Sons of St. Cloud, Minn., was the general contractor on all three projects. Costs were: Water system $77,098.25; sewers $34,906.20; treatment plant $54,-112.00. The watersphere cost $23,236, making the total cost of the project $189,352.45.

The Village of New London has no income except from taxation. These projects were financed by the sale of general obligation bonds which will be retired over a twenty-year period.

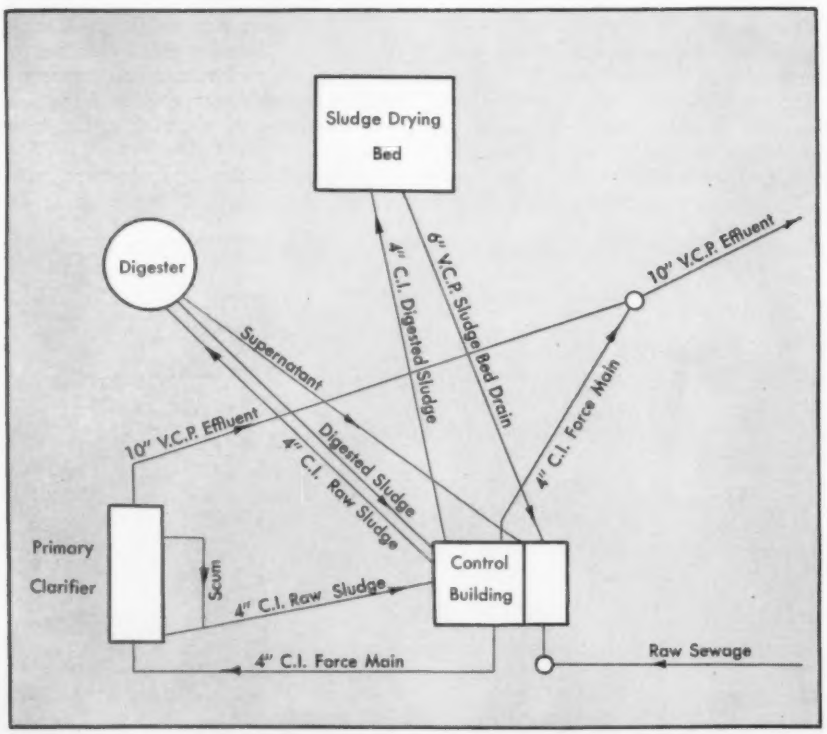
In Minnesota, property taxes are levied on 25 percent of the true valuation subject to a further reduction of $4,000 when property is used as a homestead by its owner. Because of that fact, millage rates appear disproportionately high. To assist in financing, a 15-mill tax levy was voted, plus a special front foot assessment for both sewer and water mains.

Residence property was assessed $2.50 per front foot for sewer and $2.00 per front foot for water main. Business property was assessed $5.00 per front foot for sewer and $4.00 per front foot for water main. Water service connections were fixed at $50.00 each and sewer connections at $75.00 each. The charge for service connections is from the sewer or water main to the curb line and from that point, the property owner is responsible. Payment for service connections was required in cash but front-foot assessments are permitted to run over a 20-year period or may be paid at any time at the option of the property owner.

The School Board agreed in writing to pay a special assessment of $20,000 toward the cost of the sewer system which will also be paid over a 20-year period.

Water service charges are on a flat rate basis with no meters. The charge is $1.00 per month for residences and $4.00 per month for business places. Sewer service charges are fixed at $2.50 per month for residences and $6.00 per month for business places. The fact may be noted that both water and sewer charges are proper business expenses and the businessmen were in favor of those rates.

Analysis of the foregoing figures shows that the total cost to an average resident owning 60 feet of frontage and using both sewer and water is about $5.00 per month.



● **PLAN showing arrangement of the sewage treatment plant at New London, Minn.**

BASIC OBJECTIVES IN RECORD-KEEPING

PETER F. ROAN,

City Manager,

Iowa City, Ia.

FILES and records are the very life of a city government office, yet too often they are among the most neglected areas of administrative detail. Here at Iowa City, our municipal record-keeping procedure has recently undergone a complete reorganization. We have replaced ill-organized and sometimes slipshod methods with an integrated, practical system, and our "before-and-after" story might well be instructive to city executives with a similar record-handling problem.

To begin with, we realized that reorganization was not a job to be done in bits and pieces. In addition to the Office of the City Manager there were other departments—the City Clerk's office, the Police Department, the Office of the City Engineer, and the Sewage Disposal Department—all of whose clerical and filing problems needed attention. Documents were being misfiled, unnecessary duplications were made, valuable time was wasted in hunting through unwieldy or inaccurate indexing systems, and "dead" files were in some places taking up too much of the room needed for "live" ones. A top-to-bottom overall reorganization was called for, yet none of our executives had either the time or the specialized knowledge to undertake such a job.

What we needed were the services of specialists—experts who could come into our offices, diagnose the trouble with existing methods, make recommendations and, subject to our approval, carry them out—meanwhile leaving us free to go with the business of running the city. We called in the Business Services Department of Remington Rand, whose representatives promptly began a survey into our problems. Without any interruption of our normal routine they made their observations, took their notes, and put together a report setting forth their findings and recommendations.

A Plan of Action

The report, exhaustive in detail and comprehensive in scope, outlined a plan of action with the following basic objectives:

(1) The physical centralization of as many types of records as possible in order to minimize confusion, simplify reference and eliminate duplications.

(2) The organization of administrative, permanent, and subject records, present and cumulative, for availability not only for current but also for future reference.

(3) The control of all records and record-keeping by the establishment of standard rules and procedures.

Taking one department at a time, the analysts' report itemized every flaw they had found in the existing procedure, and offered a solution. One major difficulty was found in both the City Manager's Office and the Office of the City Clerk: there were too many separate files in use, with the result that pieces of related material were often sepa-

● **PHOTO made during the survey shows cluttered condition of the record vault.**

rated and identical material was sometimes found in two or more places. It was recommended that a central records room be established, under the supervision of a capable records supervisor. The supervisor would have the responsibility for all the filing of both offices, and would maintain close control over every document by means of a system of charge-out guides.

Better Ways to Process Purchase Orders

Another point the study singled out for improvement was our method of processing purchase orders in the City Manager's office. The existing procedure was to type out each purchase order in four parts, on the basis of a written requisition, a verbal request, a duplicate sales check, or a statement submitted by the vendor. We sent the original copy to the vendor, filed two of the other copies in a file drawer to be held for the signature of the party receiving the material and for the vendor's invoice, and we retained the fourth copy in a separate folder filed by commodity.

The first recommendation for an improved system was that we should type purchase orders only from written requisitions, letters, or statements. After the original was sent to the vendor, it was proposed that we attach one of the remaining copies to the requisition and file it in a special follow-up folder under "Purchase Orders Unfilled". These follow-up folders, one for each vendor, would give us control over the status of each unfilled order by means of a colored sliding signal in the visible margin. The signal would be placed to indicate the first date for follow-up, and moved to other dates as orders are filled or requirements changed; thus overdue orders could be spotted at a glance.

One of the two remaining copies of the purchase order would be sent to the central records room, to be filed under "Purchase Order File—Vendors"—a record of which would be kept on a yearly basis—and the fourth copy would serve as the basis for a Purchase History Record, filed by commodity. It was recommended that this file, which would become the heart of the purchasing department, be kept in the form of a Kardex visible record to eliminate digging through blind files.

The Kardex system was also proposed for a simplified inventory control, covering city-owned equipment and supplies, which would give us quick reference to all the

● **FILE for public works equipment records and purchase order histories.**

pertinent data concerning these items, and, by means of margin signalling, insure control over their prompt maintenance and replenishment.

Central Housing for Records

Elsewhere in the study it was found that the City Engineer's office contained a great many inadequately housed records that might better be kept in the central records room, and it was recommended that only those of a purely technical nature or those needed for immediate reference be kept in the office itself.

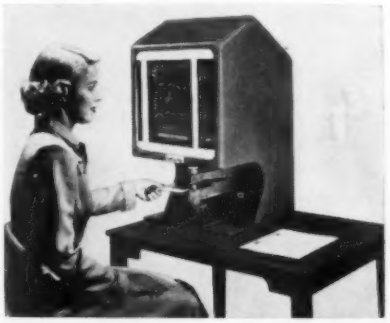
Our Police Department's vital fingerprint file was found to be overcrowded and confused by the use of many different types of file folders; an additional cabinet and standardized folders and guides were needed.

One of the major recommendations was that we establish a Records Retention Committee, whose members would include representatives of the City Council, City Manager and City Attorney. Within the framework of municipal, state and federal legal requirements, this committee would study the relative value of all our records and set up a Retention Schedule to determine which of them should be retained indefinitely, which should be retained for six years, and which could safely be destroyed after three, two, or one year's time. Once a definite, approved schedule had been established, the assigning of records into the various retention categories would become an automatic annual procedure.

All six-year and permanent records would be microfilmed, and the rolls of film kept in a separate location from the originals to insure protection in case of fire or other damage. And microfilm—through which a full file-drawer of 3,000 letter-size documents can be reduced to a reel the size of a man's hand—would also offer the solution to the storage problem for permanent records: the originals could be destroyed after six years and the films alone retained. Through the use of the Microdex indexing system, the filmed replicas could be found, read and reproduced promptly when needed. These measures were only part of the report; there were others too numerous and too detailed to be summarized here.

The reorganized records system has now been in operation long enough for us to be completely satisfied that the change was a wise one. Had we attempted the job ourselves it would have taken valuable time away from more urgent duties. It would undoubtedly have caused a good deal of confusion and might have resulted in a badly coordinated job.

Good record-keeping is now a science, its application a profession. We are convinced that a clerical problem of any magnitude deserves the attention of a professional reorganization service.



● **MICROFILM reader will be used when the record system is completed.**

Studies for Better Street Trees

A committee will make a survey of existing trees in Alexandria, Va., and will prepare a list of trees adaptable to local conditions. It also will create a master plan of trees for all streets, prepare a model ordinance, develop a financing program, and lay out a long-range program of acquiring plant stock and planting and maintaining street trees. Personnel from the public works, traffic control, and planning departments serve on the committee along with representatives of local and civic groups.

Radar REDUCES ACCIDENTS

PHIL HIRSCH

RADAR—science's newest weapon for combating the nation's traffic toll—has been showing what it can do in Hammond, Ind. Results indicate that this electronic wonder may be one of the most valuable accident deterrents developed yet. In Hammond, where the device has been in use since April, 1954, the city's overall accident rate has declined sharply. Last year's automobile fatality rate was almost two-thirds less than the average for the past 20 years. For those twenty years, Hammond counted an average of 25 traffic deaths each year, with 13 deaths as the lowest in any one year. In 1954, there were only nine traffic fatalities in the city.

Fatalities on "Murder Mile," a 1.5-mile stretch of Indianapolis Blvd., a main thoroughfare, have been cut to a fraction of what they were. And another dangerous thoroughfare, Calumet Ave., which had a record that was even worse, has also been tamed.

Hammond is located right on Chicago's southern edge and has its traffic problems complicated also by being in the center of one of the world's largest industrial areas.

Radar is not an enforcement device primarily, explains Capt. John Mahoney, chief of Hammond's police traffic division. "If every driver gets cautious to avoid being arrested, and we never spot a speeder without radar, we will be happy. We're not out for a long list of radar arrests. We're out to reduce traffic speed."

● **RADAR-EQUIPPED patrol cars and warning signs help reduce dangerous speeding.**

Radar has at least two other advantages which are almost as valuable as its effect on accident statistics, Capt. Mahoney believes. One is accuracy. Formerly, when officers arrested a speeder, the motorist sometimes challenged the accuracy of the police speedometer reading. Hammond police squashed these objections by sending the motorist out again in his own car; the vehicle that had flagged him down followed, and its speedometer was checked by officers in a police car which brought up the rear of the procession. This system, although it usually satisfied the motorist, represented a heavy expenditure of time, labor, and equipment.

Now, "less than one violator in 100 puts up an argument," according to Mahoney. "Apparently, they feel that radar is infallible—which it is if kept in working order—while an officer and a speedometer aren't. Actually, of course, there's no inherent difference between the accuracy of the two methods, but you have a hard time convincing some motorists of that fact."

Radar also has virtually ended the need to chase speeders. As Hammond's traffic chief puts it, "Before, our officers usually had to commit a violation to catch one. But now, with radar equipment at one spot, a police car up the street a way, and both manned by officers using two-way radio, usually we don't have to endanger the innocent motorist to catch the violator."

Radar has reduced danger to the Hammond police department as well as the innocent motorist. Before the new equipment was in full operation, one member of the force suffered a fractured skull when he collided with a truck while chasing a speeding car. During about two years preceding the installation there were at least half a dozen similar accidents.

Hammond's radar equipment, which was manufactured by the Automatic Signal Division, Eastern Industries, Inc., East Norwalk, Conn., consists of two units. One is the transceiver which sends out the electronic beam that checks the motorist's speed. It is a metal box weighing about 20 pounds and measuring 12 inches wide, eight inches high, and eight inches deep. The other unit is a meter for recording the speed of cars within the beam. It is a lightweight plastic box about five inches high, five inches wide, and three inches deep.

A third unit, for permanently recording car speeds, is part of the Hammond installation, although officers haven't had to use it yet. This unit also automatically stamps the time and date of the violation. All of this data appears on a paper tape, which contains additional space for writing in the license number.

Hammond police mount the transceiver on the trunk of a squad car, although it can be set up in a permanent location on a tripod. The unit requires a six-volt power supply, which is supplied through a cable leading from the squad car's battery. The speed meter hangs on the bracket that supports the rear view mirror. A cable is connected to the transceiver. This cable carries the impulses that register the speed of passing cars, in miles per hour, on the meter.

The officer sits in the driver's seat. In front of him, on the sun visor, is a large mirror for checking the license number of all vehicles that pass through the electronic beam.

The squad car is parked along a curb, facing in the same direction as traffic is moving. The transceiver can be adjusted to from one to four lanes, and to pick up vehicles either before or after they pass. Hammond police officers usually limit the beam to a maximum of two lanes and clock cars as they approach, rather than leave, the checkpoint.

One or two other police cars are located a block or more from the radar unit. They are used to flag violators down. If two cars are used, traffic in both directions can be checked, with one car, traffic in one direction.

The transceiver beam extends about 200 feet out from the rear of the squad car. After a motorist enters this beam, his speed registers on the meter until he reaches the squad car. Then he leaves the beam, and the pointer on the meter drops back to zero, unless there is another car on the beam.

The radar unit, in effect, picks up the speed of the fastest car. If several vehicles are in the beam at the same time, the officer at the checkpoint can identify the one being checked by looking in his sun visor mirror.

Every time Hammond officers issue a summons to a speeder uncovered by radar they fill out a special report form. This form lists, among other things, the license number of the car, name of the operator, and arresting officer, time, date, and location, legal speed, and the violator's radar-reported speed. The form may be submitted in court as evidence, although so far this hasn't been necessary.

Some time before Hammond acquired its radar unit, a test case established the legality of using the new device. So far, radar hasn't lost a trial in Hammond's traffic court. Between April 19, 1954, when the equipment went into service, and the end of the year, about 1,500 speeding violators were caught by radar. This was roughly one-third of the total number of arrests made by Hammond police for this offense.

Perhaps the best evidence that radar is effective comes from a comparison of Hammond's accident statistics during the last eight months of 1953, with figures for the same period of 1954.

During the eight-month period in 1953, a total of 2,285 accidents were recorded. These accidents resulted in ten deaths and 625 injuries. For the same period of 1954, there were 1,958 accidents, three fatalities, and 332 injuries.

A dramatic change in the accident picture took place on Indianapolis Blvd., from Sumner St. to the city limits. This is the stretch known as "Murder Mile." Capt. Mahoney recalls that during one 30-day period on this thoroughfare, five persons died within 100 feet of each other.

An average of 3.8 persons a year had been losing their lives on Indianapolis Blvd., during the 20 years preceding the installation of radar. In 1954, there was one fatal accident, caused by an intoxicated pedestrian rather than a careless motorist, according to Capt. Mahoney.

The transformation on Calumet Ave. has been even more startling. This road, which runs through a largely unimproved section just inside the city limits, had accounted for 129 fatalities in 20 years, an average of more than six deaths a year.

During the first eight months radar was in use, the fatality rate dropped to zero. Both Calumet Ave. and Indianapolis Blvd. are radar checked at least once a day. Capt. Mahoney feels this intensive surveillance has been the major factor responsible for the decrease in accidents.

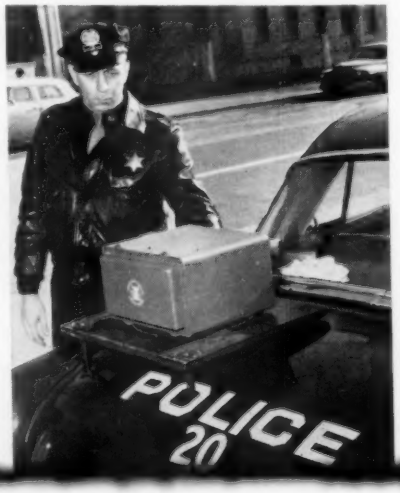
Before the new equipment was put in service, police conducted an extensive public relations program. The *Hammond Times* ran a long series of articles which, among other things, emphasized that radar is foolproof. Pictures of one of the most common dodges—metal foil on the car's aerial, a grounding chain hooked to the rear bumper—were shown not to work. One practice was encouraged, however—the practice of one motorist flashing his lights to warn those coming of the presence of radar. "If flashing lights will cause motorists to decrease their speed, we're all for it," Capt. Mahoney stated in the newspaper article. "We're sincere when we say that our radar equipment is aimed at reducing the accident hazard, not in jamming up the traffic court."

Police also gave lectures to virtually every civic, fraternal, and church group in the city. Then, for the first two weeks the radar equipment was used, violators received warning notices. After this period, all speeds were measured for a short time by both radar and by an officer mounted on a motorcycle, to double check the radar's accuracy.

Normally, the transceiver is at work 16 out of every 24 hours. From six to eight locations, determined from daily accident reports, are covered each day. Over a period of a month or two, all of the city's hazardous streets are checked several times during the day and night.

All speed limit signs in the city are accompanied by the words "Radar Enforced." Capt. Mahoney believes that this legend exercises an effect on the motorist that prevents far more accidents than the radar unit does by uncovering violators.

The gradual introduction of the new device, accompanied by an extensive public relations program, has also played an important role. Today, virtually every Hammond motorist knows the device is in use, and knows, furthermore, that it probably "sees" him before he sees it. As a result, most of the city's drivers, if they didn't think twice about speeding before, do so now.



PLANNING SEWER MAINTENANCE YARDS and SHOPS

A. A. APPEL

Superintendent of Sewer Maintenance

Los Angeles, Calif.

IT is highly essential, in order to achieve efficient and effective field operations, that properly planned and centrally located yards be provided for any maintenance or operating division. Fundamentally they are the base from which all such correlated functions of work must start. The facilities provided in most cases should make them a self-sufficient and independent unit, except where a central supply yard or heavy duty repair shop is available to all yards. In small municipalities sewer maintenance and personnel must, for reasons of economy, be housed in one general yard with other municipal divisions. However, in such cases, it is still highly desirable wherever possible, that a portion of a yard be designated for sewer maintenance operations and storage of material and equipment in order to reduce confusion during each morning's preparation of the day's operation. In the cities where separate yards have been acquired for sewer maintenance operation, it is of primary importance that careful and detailed planning be made of the yard area in order to place properly the various facilities in a manner that will result in the minimum of interference between the various crews preparing for their respective day's work. Future expansion of existing facilities should be carefully considered in preparing the layout of the yard area, and sufficient ground should be acquired to provide for any future enlargement.

It is to be recognized, particularly in large cities, that considerable time in manpower is lost because of traffic delay, while moving from Yard to the job location. It is, therefore, of primary importance that fast-growing communities prepare a long-range program for dividing the city into districts which contain 600 to 800 miles of sewer and then locate the district yard as centrally as possible. Generally it can be assumed that an acre of ground will require approximately 150 feet of sewer to serve the area. Thus by knowing the square miles in an area, the miles of sewers which will eventually be contained therein is readily ascertained. Generally also it can be assumed that for every 100 miles of sewer, a three-man crew will be required properly to maintain the length of the line. Thus each District Yard should be designed to provide equipment and personnel facilities for approximately six to ten crews depending on additional functions of work to be performed.

Even in small communities where a yard has existed for years, it would be well for administrative personnel to study the problem in the light of present traffic conditions in order to relocate the yard to provide quicker and more efficient service to the community and to reduce traveling time of crews. Land which may be readily available and comparatively cheap at the present time may be lost in the immediate future. Investigation within the shortest possible time of sewer complaints from irate taxpayers reflects to the credit of the municipality and enhances public relations which have been in general sadly lacking in past years.

Location is Important

For reasons stated above, the placing of the Yard in the most centrally available location is of prime importance. It therefore follows that yards may be situated in an area where the adjacent improvements are average or better. As the Yard and facilities are the visible expression of the thinking and planning of the City administration, the architecture of the buildings and landscaping should be such as to blend harmoniously in with, and be a pleasing asset to, the adjacent community as well as be basically arranged to house proper-

ly all equipment required to perform this function of municipal work. In considering the general outside appearance, sufficient setbacks should be provided to allow for well planted areas, and the color of the buildings and walls should harmonize accordingly. Whenever possible, six-foot high block walls should surround the open yard area so that stored materials cannot be seen from the street. Good public relations and reactions will be immediate when the taxpayer sees that his tax dollar has been judiciously spent on modern facilities and is then properly maintained.

Basic Yard Design

The primary design of the Yard should provide for the proper housing of all types of equipment and most of the materials, with the exception of those items such as clay pipe, rock, etc., which are not affected by inclement weather. For obvious reasons special storage space should be provided for cement, brick, lumber, and other small materials. A sufficient number of platforms, both inside the buildings and outside in the yard area, should be provided at truck bed level for storage of the heavier materials required in the daily operations.

A platform, hand-operated hoist has been found to be most convenient when the lifting of unusually heavy pieces of equipment is necessary. Separate equipment storage space for pumps, compressors, concrete mixers, generators, fire hose, suction hose, and all other such items is most advantageous, as a quick glance will indicate those items available, and all needed equipment is readily in one place for loading. Concrete bins, in which sand, rock, asphalt, and dirt fill are stored—confine such material in separate spots and prevent deposition of unsightly piles within the open yard area.

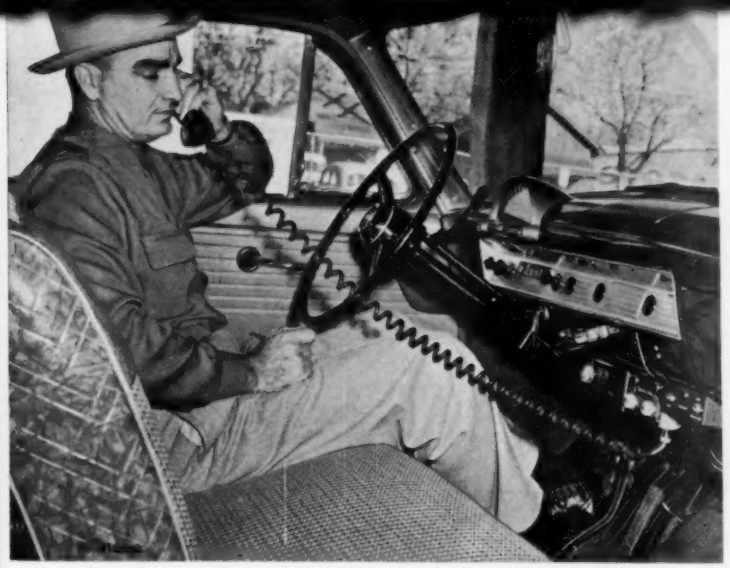
Depending on the land area available, the office may or may not be attached to the other buildings. It should be of sufficient size to provide for proper filing of field maps and records and storage of small costly tools and office materials. Good lighting, heating, cooling units, and toilet facilities should also receive due consideration. The facilities required for the operating personnel should include locker, assembly room, and lavatories. Such small conveniences as a sink, hot plate, and cooler drinking fountain provided in the assembly room can add surprisingly to the over-all morale of the Yard personnel. Suitable type interior walls and floors to permit fast and easy cleaning is of primary importance. Shower booths where the men can take a hot shower after a dirty job is an item that is always appreciated.

If the Sewer Maintenance Yard is a separate unit, a gas house must be a part of the Yard facilities. The gas house can be divided into two rooms: one to house the oil and kerosene drums and for cleaning and storage of lanterns; the other room can be made into a storage and repair shop where the Yardman can make minor repairs to small tools and equipment. The shop should be equipped with a small drill press, grinding wheels, a pipe vise and such other small hand tools as are required.

Finally, proper Yard lighting for night operations, and which can be set to turn off at any desired time, is essential. A wash rack where trucks and portable equipment can be cleaned is most desirable, as neat and clean-appearing equipment generally indicates an organization with good morale and leadership throughout.

Central maintenance shops for Sewer Maintenance operations will vary in size and scope as the variety of operations require. Some organizations are responsible only for sewer lines, while others may include storm drains, pumping and ventilating plants, as well as treatment plants; thus it is obvious that the size of the shop and the machinery requirement can vary widely. It is certainly more economical in many instances to contract out repair work to the original manufacturer of the pumps or electric motors rather than spend considerable sums of money to purchase needed machinery to perform such work. In smaller municipalities where all functions of public works are housed in one yard, it would then possibly prove to be of greater economy to have a central repair and maintenance shop, manned by specially trained personnel.

● **OFFICE and yard entrance. The attractive building, plantings and generally neat appearance of this facility contribute greatly to good community relations.**



● **SELECTIVE** signaling system flashes red panel lamp when there is a call for driver, or blows horn when he leaves car.

● **DISPATCHER** at the base station of the San Antonio City Water Board's radio system presses buttons to call vehicles.

TWO-WAY RADIO

IS AN INDISPENSABLE WATER DEPARTMENT TOOL

R. A. THOMPSON JR.,

General Manager, City Water Board, San Antonio, Texas

SAN ANTONIO City Water Board's selective signaling two-way radio system, after its first three months of operations, has proven to be virtually indispensable. The system can be highly recommended to every potential user on four grounds:

1. It increases efficiency.

2. It saves money by making it possible to reach trouble spots before extensive damage occurs.

3. It is a tremendous asset in the Board's public relations.

4. It provides far better control for supervisory personnel.

The "Quick-Call" system installed for San Antonio's water board by Motorola is believed to be the first of its type serving a utility in Texas. It is different than the two-way radio communications universally in use in one highly important feature: It isn't necessary for all units to be listening in to all messages at all times.

Through its "selective signaling", it is possible to speak to only one driver at a time, and, if necessary, as many drivers as required at one time. The base station can achieve this simply by pressing a button for an individual car, or a group-call button for 10 cars and trucks used by supervisors and key employees. The push of the button flashes a red light on the dashboard of the car, or cars, being called, informing them to switch on the receiver.

In addition to this unique feature of the selective signaling system, the two-way radio has another innovation which lends emphasis to its efficiency. If it is necessary for the driver to leave his vehicle, he simply throws a switch. If there is a call for him, the horn blows for seven seconds, summoning him back to get the message.

Pump Stations Equipped

At present, San Antonio has 53 units in operation and also monitor receivers at three main pumping stations. The monitors make it possible for men at the stations to adjust pumping rates almost immediately when any major trouble is reported.

Communication is not limited to instantaneous contact between base station and vehicles in the field. It is possible for the vehicles to communicate with each other. For example, if a man in the field desires to contact his foreman, he calls the dispatcher who signals the foreman and, with a flip of a switch, the conversation can begin.

Water Board crews are at work in most parts of the city at all times, so that in the event of a break or other difficulty, it is possible to have crews on the scene almost immediately. It is a far cry from the days not so long ago when it was necessary to send out messengers with calls for crews in the event of emergencies.

Of course, it would be foolish to pretend that installation of the selective signaling radio system has eliminated the usual flow of complaints every water works is heir to, but this much is now certain, after three months of operations: San Antonio's Water Board is now receiving more compliments from customers than ever before in appreciation of fast, efficient service. It is easy to visualize the expanding sphere of good will that will accrue to the water works over a period of time as more and more such prompt service is performed and more and more customers tell their friends and neighbors about this satisfactory service.

In fact, there is a prime example of how the radio system performs in another way to improve the board's public relations by preventing complaints. Before the radio system was installed, it was hardly possible to head off an employee who had left the office in the morning with a service cut-off order. Every water works, no doubt, has endured the outraged screams of customers who rushed in at the last moment to pay bills—after the cut-

off order had been issued—and who discovered they didn't have any water when they got home. Now, however, it is a simple matter to contact the employee and cancel the order to discontinue service—or to direct that service be restored if the order had already been carried out by the service department workman

In fact every department of the San Antonio City Water Board benefits from the system. Its facilities are used by all branches, keeping supervisory personnel in close contact with the field at all times, on a 24-hour basis, if necessary. The system has a range of more than 30 miles, which is adequate to cover the area served by the board, and was installed at a cost of approximately $50,000. It is operated on a frequency of 153.41 megacycles.

All Water Board vehicles undergo a monthly preventive maintenance check and, at the same time, the radio-equipped cars and trucks also are inspected by a local Motorola franchised service station. After certain adjustments necessary in the early "shakedown" period of the system, little maintenance has been required.

It is contemplated that the radio system will prove still another asset to the community as a part of the civil defense program. Under consideration, in cooperation with civil defense authorities, is creation of a network involving two-way systems now in operation by police and fire departments, the gas and electric utilities and taxicab companies (although none of these has selective signaling).

If the plans of the San Antonio Junior Chamber of Commerce can be carried out, emergency base station transmitters will be installed at a point isolated from the heart of the city, housing also standby power facilities for all radio communication systems. These systems, in turn, will be connected by a wire pair with the various control stations but also may be operated at this isolated point. These plans are in conjunction with the federal, state and city civil defense programs and have the cooperation and active support of the San Antonio City Water Board.

Refuse Collection Data Reported by San Francisco

GARBAGE and refuse is picked up at back doors in residential districts of San Francisco, Calif., once or twice a week by private scavenger companies. In the downtown districts, where amounts of paper and garbage accumulate, general collections are made three times a week. At the larger hotels, collections are made daily. No segregation is required on the part of the householder, but some salvaging is done by the collectors enroute and at a sorting shed near the disposal site. Paper, bottles, rags, metals, etc., are removed before weighing the amount of garbage hauled to the dump.

The two scavenging companies used 146 trucks and averaged 272 trips per day. Each truck has a capacity of about 20 cubic yards but after the removal of salvaged materials, the load carried to the fill averages about 18 cubic yards. Total daily collections averaged 878 tons in 1953. The scavenger companies operate six days a week or about 312 days a year. Saturday collections are slightly above 60 percent of normal week day collections. The average weight per load was 3.23 tons and the average weight per cubic yard was 359 pounds.

Twenty-six flat bed trucks were used to haul waste paper, the total amount collected being 24,024 tons, an increase of 2½ percent over the amount collected during the preceding year. Of the total amount collected, 16,589 tons were salvaged which was about 15 percent less than the preceding year. The remaining 7,435 tons of paper were hauled to the fill and burned in a remote area. It has been found inadvisable to mix large volumes of paper with ordinary garbage and refuse because it creates a fire hazard.

These data are from the 1954 report of the Department of Public Works of the City and County of San Francisco, Calif.

Nine Miles of Sewer Includes 22 Stream Crossings

A NEW $1,300,000 sewer addition is being built by Columbia, Mo., to care for a 75% population increase in the last 20 years. B & G Constr. Co., Carthage, Mo., which has the contract for $556,406, uses a one-yard Lorain-50 hoe for the job of digging the primary trench. They also are using a ¾-yd. Lorain as a crane for pile driving and material handling on the many stream crossings in the contract. There's a lot of ditch—some of it 18 ft. deep—in rock, sand and clay—more than 45,300 linear ft., besides 122 manholes, 22 stream crossings and 3 railroad crossings. Finish time is 545 days.

● **LORAIN backhoe has helped contractor get ahead of schedule on this sewer job.**

IN BIOLOGICAL TREATMENT OF DOMESTIC WASTES

GEORGE W. REID, C. E.,

Associate Professor of Civil Engineering and Public Health,

University of Oklahoma

CONSIDERABLE progress throughout recent years has been made in the technology of waste disposal by biological methods. Whether liquid waste, such as domestic sewage, or solid waste, such as garbage and trash, the profession is now in possession of highly efficient means of treatment. In sewage, the methods have progressed from lagooning and dilution through intermittent sand filtration to activated sludge and high capacity filtration. This progress can be best illustrated by treatment area required as shown in Table 1, noting the increase in population per acre capacity of the various processes. Unfortunately, the current emphasis is still on disposal, and it should be on utilization or recovery. Progress has been made in this respect with the solids of sewage in that usable gas and humus are produced.

In the case of garbage and trash, though utilization and recovery have been attempted, the more economical treatment at present is one of disposal. The art has advanced from dump and hog feeding, to incineration and to the current practice of sanitary land-fill. The land-fill is generally accepted as the most economical technique at present, but aside from some land recovery, it must be again considered essentially a disposal process and not one of recovery. Also, both liquid and solid domestic wastes are of the same origin, handled by the same agency, and should logically be handled together rather than as distinctly separate problems, as they are generally done today.

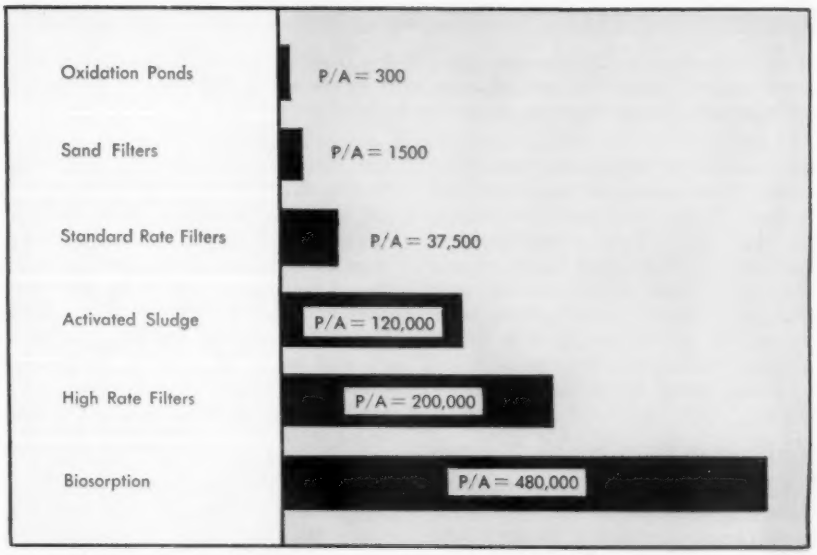
Horizons in Liquid Waste Disposal

It is the author's opinion that the biological treatment of sewage has progressed about as far as it should from the rather negative standpoint of disposal. That sewage is a food is a basic fact, and a use should be made of this food. In a civilization such as ours, it becomes more and more apparent that much of our profit is in our waste reduction or utilization. For example, the sewage effluent from the Oklahoma City (Okla.) Southside Plant discharges an average of 8300 lbs. of nitrogen and 2500 lbs. of phosphorus per day —roughly the phosphates in 60,000 lbs. of commercial fertilizer. Phosphorous is the more competitive of the two.

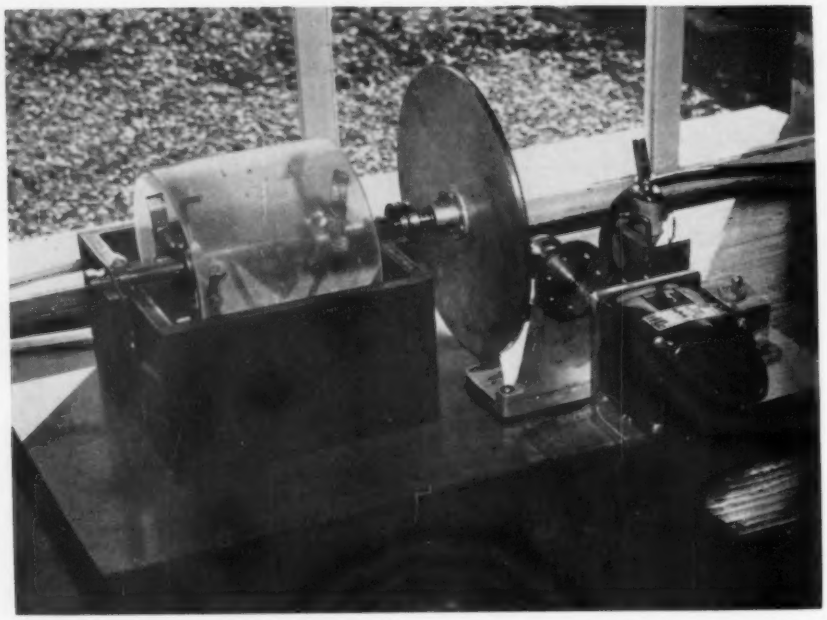
Such liquid fertilizer has caused excessive growths of phytoplankton downstream from the sewage plants, particularly harsh conditions resulting in the southwest where adequate dilution is rare. Chemical treatment in the form of copper sulfate, chloroben, chlorine, etc., has been resorted to in an attempt to prevent these growths or to render the effluent usable for industrial purposes. Another approach has been to remove the phosphorus chemically by lime, alum, or iron precipitation, thus preventing the growths. But this is negative thinking. This valuable material should be removed biologically—for example, by growing rough fish. Oklahoma City could grow approximately 40,000 lbs. of fish which, at 25¢ per pound, would mean a profit of $10,000 per year with no expense for chemicals to remove the phosphorus. There is an ample market for rough fish in cat food, etc.

Another approach would be to grow algae, which would provide more efficient utilization of the food. Algae requires sunlight, carbon dioxide, phosphorus, and nitrogen, all of which are present at the sewage plant in ample supply. The algae would use the carbon dioxide from the sludge gas and the nitrogen and phosphorus from the effluent. Herein lies the boundless horizons of waste disposal and utilization.

Figure 1 is a photograph of a pilot plant being used at the University of Oklahoma to study algae growth



● **TABLE 1, representing the area requirements of biological sewage disposal processes now in use. The factor P/A is the population served per acre of process.**



● **ALGAE grown on the revolving drum of this experimental model are harvested by a moving knife edge. This type of plant, under study at the University of Oklahoma, grows attached algae types in an environment of sewage aerated with sewer gas.**

in sewage and sewage gas environment. The algae, of an attached type, is grown on a revolving drum and harvested by a scanning type knife edge. The drum dips through sewage aerated with sewage gas. If these current studies prove successful, a prototype of this plant will be built at the Southside Sewage Treatment Plant in Oklahoma City.

Horizons in Solid Waste Disposal

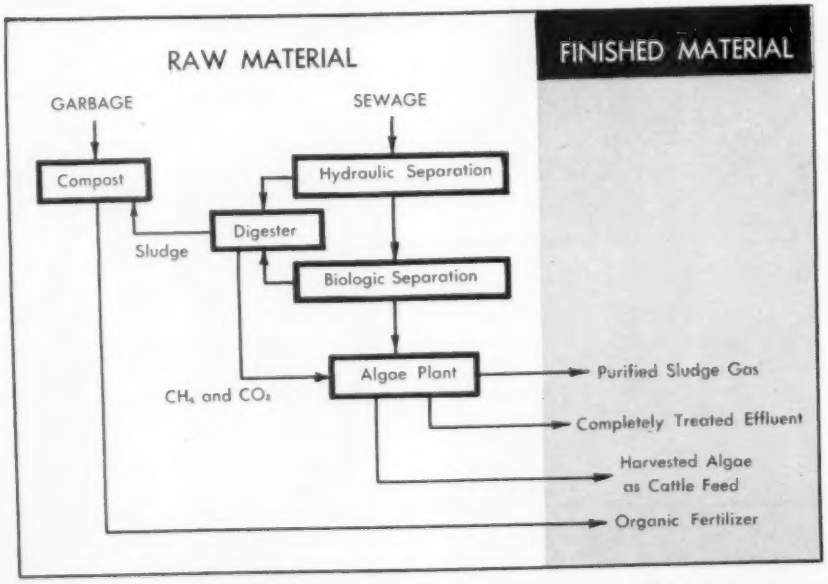
When one considers that the per capita production of solid wastes (garbage and refuse) is approximately two pounds per day, the waste of using this organic material as land-fill becomes enormous. In Oklahoma City, for example again, this annual loss of organic material (on a wet basis) would be approximately 150,000 tons. The most promising process for the recovery of this material appears to be the aerobic compost.

Compost has been used for years as a method of converting organic material of all sorts into usable humus. In recent years, the typical anaerobic compost, used by farmers, has been converted to an aerobic process on municipal scale. In France, Holland, Germany, and India, many cities are at present salvaging their trash, grass and tree cuttings, street flushings, and garbage through applications of this process.

The demand for humus has so increased that American cities are now using compost to salvage domestic waste. Also, several large industrial groups with an organic waste are using the technique to dispose of and recover at a profit, their wastes. The cotton industry in Texas, and the peanut industry in Georgia are good examples.

Considerable research has been done on the aerobic process, and it is now known how to construct and operate through-type plants. One can now accomplish in days that which formerly took months to achieve. The trick is in knowledge of the waste, appropriate use of inoculum when required, the shredding and separation of the waste, and the control of air, C/N, and moisture.

Of particular promise is the incorporation of trash and other wastes with domestic sewage sludge for compost. The sewage sludge is used to lower the C/N rates and to control the moisture content. If 60 percent of the solid wastes from Oklahoma City is compostable, nearly 200 tons of organic fertilizer could be recovered per day. With compost selling at $20 per ton, this would realize $4,000 per day and this would certainly change the ledger from disposal costs to recovery profits. The area requirements of such a plant would be approximately 75 acres; for comparison purposes the P/A value would be 20,000.



● **FIGURE 2. Idealized flow sheet represents the processes involved in the biological utilization of our domestic wastes to produce valuable finished materials.**

An Integrated Program

As has been previously noted, considerable economy could be effected if sewage, garbage and refuse were all handled in one coordinated process. Figure 2 illustrates schematically how this might be accomplished. Briefly, the sewage effluent and digester gas would be used as algae food. The effluent would be relieved of its fertilizer value and thus stream pollution would be prevented. The useless CO_2 component of the sludge gas would be recovered and the sludge gas used to run the entire plant. The garbage, refuse and sewage sludge would be combined into compost producing organic fertilizer. The same personnel and control laboratory could be used for both operations. Is this a horizon or a Rube Goldberg?

BUILDING BRIDGES WITH PAPER TUBES SAVES MONEY

● CLOSEUP shows how hollow paper tubes are placed, ready for concrete pouring.

W. J. LUTZ, Public Relations Dept., State Highway Commission of Kansas

A VARIATION of a reinforced concrete slab span bridge has been developed by the Bridge Design Department of the Kansas State Highway Commission. This design should save the state in the costs of concrete and steel. In outward appearance, the bridge will look exactly like any other bridge of similar design. However, it will contain one thing different. Embedded in the concrete slab will be hollow paper tubes. It is these tubes which bridge design engineers for the Kansas Highway Commission feel will be the money saving feature.

The first of the newly designed structures, called hollow reinforced concrete slab by the design engineers, is now under construction in the state. Three are scheduled to be built this year.

The hollow paper tubes are from nine to fourteen inches in diameter and up to fifteen feet in length, depending upon the stress characteristics in the structural design. They are placed longitudinally through the slab to lessen the dead load of the structure. Except for the holes that will run longitudinally through most of the bridge, they will be like other slab-type structures.

The tubes are rigid enough to prevent their collapse when covered with concrete. They are plugged at the ends and waterproofed. To be on the safe side, however, a method is being provided to drain them so that entrapped water will not freeze and injure the structure.

Ted Elcock, bridge design engineer, states that the tubes eliminate the concrete near the center of the slab that is not essential to the strength of the structure. The innovation also will allow the use of this basic design at locations where somewhat longer span lengths are needed. Heretofore the maximum span length in solid slab structures has been 45 feet, but by using the paper tubes it will be possible to increase the maximum length to 60 feet.

The bridge now under construction is a six-span structure, 255 feet long, set on pedestal type abutments and piers. It will carry a 28-foot roadway and will eventually be one of twin structures for opposing traffic lanes.

Another bridge project, now under way in Kansas, is attracting considerable attention among the state's bridge engineers. This project involves the first prestressed bridge to be built in the state.

Despite the fact that it is a small three-span structure and is being built on a county secondary road, this bridge equals the hollow reinforced concrete slab span structure in importance to the department's research division. Prior to the construction of the bridge itself, a test girder was poured and subjected to a series of failure tests so that valuable data could be obtained.

The post-tensioning method of prestressing the concrete beams was used on the test girder and will be used on the structure itself. The test girder was a T-section 31 inches across the top and 22 inches deep with diaphragms at both ends at the one-fifth points. The high tensile steel wires, used for stressing the beams, were stretched approximately 2.6 inches and the free ends anchored. The wires were placed in four hollow conduits spaced longitudinally through the center of the girder. From six to eight quarter-inch wires were used in each conduit. After the wires were stretched and anchored, the holes were filled with concrete to bond the beam and cable.

Two tests were made on the girder. The first was to partial failure and second to complete failure of the beam. On the first test, the girder was loaded to three times its design load capacity before it showed any cracking. The girder registered a deflection of about five inches which it recovered when the load was removed. On the second test, it was loaded to five and one-half times its design capacity before it broke. This time the beam registered a 20-inch deflection but recovered all but five inches after the load was removed.

Engineers conducting the tests are highly optimistic over the results. "It's too early to assay all of the advantages and disadvantages of this prestressed structure," one said, "however, we have obtained some pertinent data on this type bridge."

● Increased needs for new water supplies lead to research and development in

SALINE WATER *CONVERSION*

A letter from

JOSEPH J. STROBEL,

Acting Director, Saline Water Conversion Program

U. S. Department of the Interior

THE continued expansion of our industries, our growing population, and the expanding agricultural production have increased tremendously the demand for large quantities of fresh water. This continued growth and expansion has placed a severe drain on our water resources in certain areas. In many instances new reservoirs have had to be constructed and water transported over ever greater distances; in other cases the water supply has been supplemented by new wells, which have lowered the water table. The pumping of ground water for irrigation in many areas has been at rates considerably above the safe yields, as estimated by the U. S. Geological Survey; consequently, the natural water resources, in many instances, are gradually being exhausted and through use and reuse are being contaminated. The need for additional fresh water, therefore, is obvious to all who have considered the problem.

In view of the national importance of the water problem the 82nd Congress enacted Public Law 448. The Act provides for the development of low-cost processes for converting saline water to fresh water for agricultural, industrial, municipal, and other uses. The Department of the Interior carries out this Program by conducting scientific research and development by means of grants and contracts, and by stimulating the interest of private and public organizations and individuals in the problem. The Program is directed equally to the reclamation of inland saline waters and conversion of sea water.

The disparity between the Program's objective costs and the present cost of converting sea water is still large. At the initiation of the Program the cost of converting sea water to fresh water by the best processes available was estimated at about $400-500 an acre-foot; consequently, two cost criteria were established, one for municipal water and the other for irrigation water. These goals were $125 and $40 per acre-foot (38 and 12 cents per 1,000 gal.), respectively.

Much work remains to be done before these cost goals can be realized. Furthermore, recent results have indicated that no single process will provide fresh water for all purposes at all locations and under all circumstances. Thus it is desirable that several different principles, processes, and combinations of processes be investigated and developed concurrently.

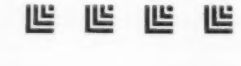
Preliminary results, obtained from one vapor-compression investigation, when extrapolated to large-scale operation may permit the production of fresh water from sea water for approximately one-fourth the cost of distilling water by any process in use at present.

Preliminary estimates for a critical-pressure device of large capacity indicate that fresh water may be obtained from sea water at a cost of around $100 to $260 per acre-foot.

Other processes under development include an ion-transfer membrane demineralizer, which is undergoing field tests at the present time; various aspects of the vapor-compression distillation process, some of which will reach field-testing stage next year; solar distillation, solvent extraction, freezing, osmotic processes, and ultrasonics.

Initially, most of the research and development on processes has been on a relatively small-scale laboratory basis, and only nominal expenditures have been required. Much of this exploratory and more or less fundamental research needs to be continued. However, as individual processes, which show sufficient promise, are developed in the laboratory, pilot plants or field tests become necessary. Such tests are essential in order to obtain reliable cost estimates and information on the durability of the unit, down time, production capacity, power requirements, corrosion, etc.

Encouraging results are being obtained and the attainment of the goal of winning fresh water from sea water at a price which municipal users and some industries might pay, and the conversion of brackish water to irrigation uses, seems to be in sight. However, much additional work will be necessary before either can be brought to realization.



Equipment Storage Buildings for Wayne County

Three Armco steel equipment-storage buildings were erected at the Wayne Co., Mich., Parks and Forestry Division Yard. The largest of the three buildings is 200 ft. long, 40 ft. wide and 12 ft. high, equipped with ten 12-ft. wide steel sliding doors, two service doors and slag and gravel floor. It will be used for storage of tractors, sprayers and other equipment. The next largest building is 120 ft. long, 20 ft. wide and 12 ft. high, with four 12-ft. steel overhead doors, two service doors and a concrete floor. The building is being used for storage of park and forestry supplies. The smallest building is 60 ft. long, 20 ft. wide and 12 ft. high, with the front side open, slag and gravel floor, and is being used for storage of farm machinery and equipment. All three buildings rest on poured concrete foundations and are primed and painted.

CHLORINATING WATER IN ELEVATED DISTRIBUTION TANKS

EDWARD S. HOPKINS, Consulting Engineer, Baltimore, Md.

SAMPLES collected during the summer with water temperatures above 60°F. frequently show high coliform organism density. With increase in distribution system velocities during maximum water consumption, these organisms are dislodged from the slime coating found in the interior walls of the pipe system and their concentration in the water is usually in direct proportion to the increase in velocity in the lines. When it is recognized that the average residual chlorine concentration used in water purification does not kill yeasts, molds and spores, it is obvious that their growth as a slime coating on pipe lines will occur in warm weather. This slime coating serves as a habitat and source of food for the coliform organisms, as was demonstrated some years ago by Sanborn.[1]

Increase in coliform densities under these conditions is not a health hazard and is of little sanitary significance. However, there is no assurance that a sanitary defect, such as a cross-connection, is not causing the increased coliform densities and secondary disinfection is indicated. This is particularly important since the 1947 United States Public Health Service Drinking Water Standards require:[2]

> "the water system in all its parts should be free from sanitary defects . . . and all known sanitary defects should be systematically removed.
>
> "The bacteriological examination of water considered under this section shall be of samples collected at representative points throughout the distribution system. . . . The frequency of samples and distribution of sampling points shall be regulated to assure protection of the water concerned."

During cold weather conditions, it is possible to maintain a small free available residual chlorine concentration throughout a distribution system by disinfection at the source or at the purification plant. In summer, with increase in water temperature and subsequent absorption of chlorine by the organisms in the slime, residual concentrations cannot be maintained except by secondary chlorination.

● **THIS radial cone 1 MG tank is 79 feet to the bottom—a big climb.**

In an article published some years ago,[3] it was shown that the coliform densities of water in a distribution system increased in distant sections unless this secondary chlorination was practiced. In relation to the system studied, this disinfection was accomplished by automatic chlorination of the effluent from a series of balancing reservoirs and by periodic applications of HTH solution to the several elevated storage tanks in service.

It is normal summer procedure to apply HTH, perchlor, penchlor or liquid chlorine to the water in elevated tanks scattered throughout the distribution system at weekly or other periodic intervals. The chlorine solutions are usually manually applied to the tanks with personnel climbing to the top and distributing the material through the trap door. This procedure is laborious and entails some physical risk, particularly for older personnel; and while management frequently believe that the required periodic dosage is being given, careful investigation of the chemical stock pile with interrogation of personnel frequently indicates that the application is sporadic. The mental and physical hazards are such that every effort is made to circumvent the job.

It is believed that should the chlorine solution be pumped to the top of an elevated tank through a plastic line leading from the ground, the task would be faithfully performed and the desired periodic applications be accomplished The plastic pipe may easily be fastened to the ladder extending up the tank framework and can be carried from the ladder to the roof. The pipe can extend into the tank for a considerable distance and project downward to assure discharge of the chlorine solution to the water surface without excessively spraying the interior side walls.

The chlorine solution may be purchased directly as such, or obtained from HTH or similar materials. A stock solution can be prepared in a 10-gal. ceramic crock with pump suction taken directly from it through a rubber hose. Using a pumping rate of 1 gpm requires ½-in. diameter plastic pipe. The pump may be of stainless steel, electrically driven with a self-contained motor unit, PP1-M Eastern Midget pump or equivalent, having a capacity of 1.16 gpm, against 80 lbs. pressure. Power for the pump may be provided at the tank or a porta-

ble generator can be used. The generator, crock, pumping unit and chlorine solution or chlorine powder and a tank of water, if necessary, may be carried in a ½-ton truck, the driver handling the application of the chlorine solution. It will be necessary to flush the pump and plastic pipe with clean water into the tank after each application to be assured that the chlorine solution did not remain in the system and corrode the pump.

The Better Way

It is more economical to use a portable generator than to install fixed electric power at a tank, since the generator would be available for other work, such as supplying power for flood lights on night ditch work, etc. It is also cheaper than a direct gasoline-driven pump, or to install a power take-off on the truck and belt it to the pump.

Should a water line be installed at the tank for the preparation of the chlorine solution, it should be valved in such a manner that it could be drained when not needed during the winter months.

Cost of installation would approximate: For the pump and motor $135.75; portable generator (1,000 watts) $312.00; 2 ceramic crocks (10 gal.) $10.00; pipe, valves and fittings for each tank 100 ft. high $92.45; a total of $550.20. Amortized over 5-year period at 4 percent interest, this gives an operating cost per year of $132.05. Cost of chlorine solution or powder would vary from year to year.

It is recognized that this procedure would be of value for both large and small distribution systems. It is not believed that it is more economical than the manual application customarily practiced. However, a periodic application of the chlorine solution would be assured, eliminating high bacterial densities frequently found in the summer.

References

[1] Sanborn, T.R., Slime Producing Coliform and Coliform-Like Bacteria, J. Bacteriology 48; Jan. 211 (1948).

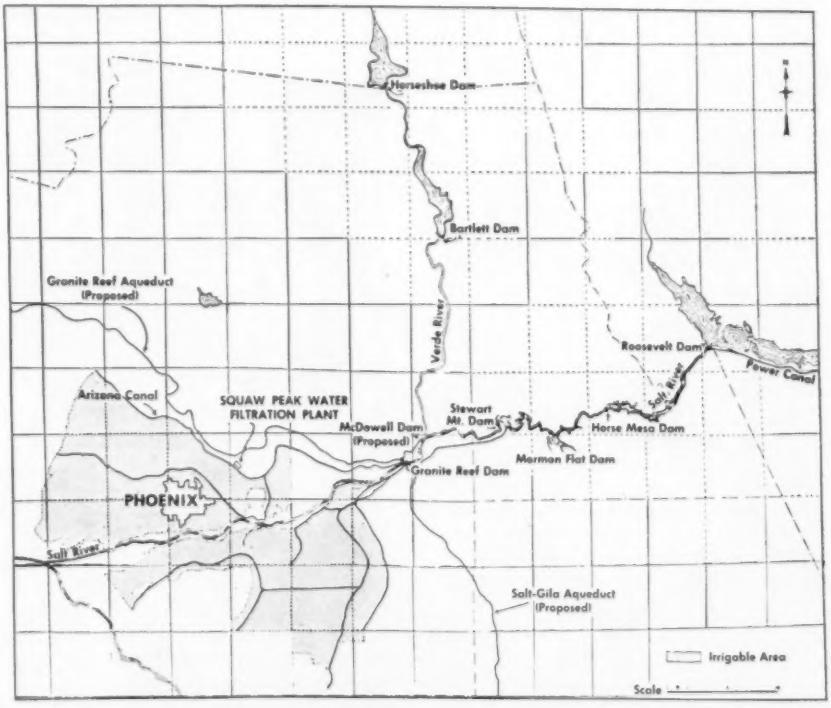
[2] U.S. Public Health Service, Drinking Water Standards, 1946, Reprint No. 2697, Public Health Reports, 61; 37; March 1946.

[3] Hopkins, E.S., and Edwards, S.E., The Control of Water Quality in the Distribution System, Public Works, 78; 20, Jan. 1947.

EQUIPMENT in the SQUAW PEAK FILTRATION PLANT

TO MEET the needs of the rapidly increasing population of Phoenix, Ariz., the Squaw Peak filter plant was recently built, adding a substantial capacity to the existing facilities. It has a normal capacity of 30 mgd, but can be operated at a rate as high as 40 mgd. Treatment consists of coagulation with lime and alum, sedimentation, filtration and pre- and post-chlorination.

Bulk chemicals are brought to the plant by truck and discharged into a hopper which is controlled by a hand operated winch. Chemicals are fed out of the hopper through a Link-Belt rotary cut-off valve and elevated 42 ft. by a Link-Belt continuous bucket elevator. The chemical may be distributed to any one of four 120-ton storage bins by Link-Belt screw conveyors. Three of the bins are used to store alum and one bin to store lime.



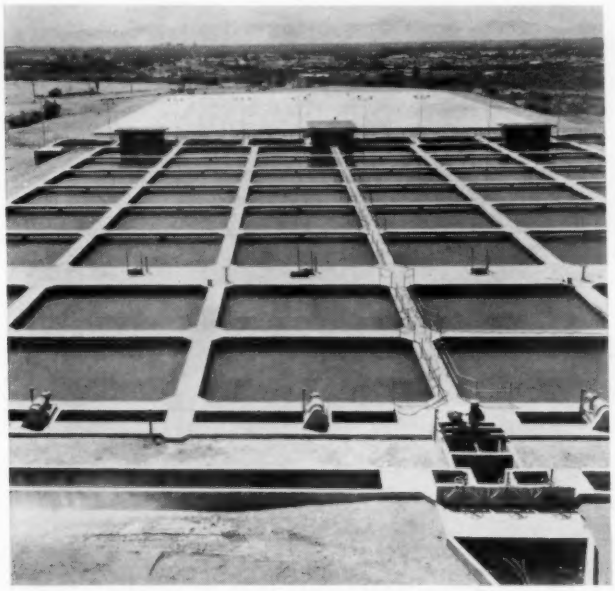
● **LOCATION map shows Phoenix in the Salt River valley and the dams and canals now in operation; also proposed dams and Granite Reef and Salt-Gila aqueducts.**

● **SETTLING** basins, with chemical building and filter wash-water tank in the background. Squaw Peak, behind the chemical building dominates the terrain.

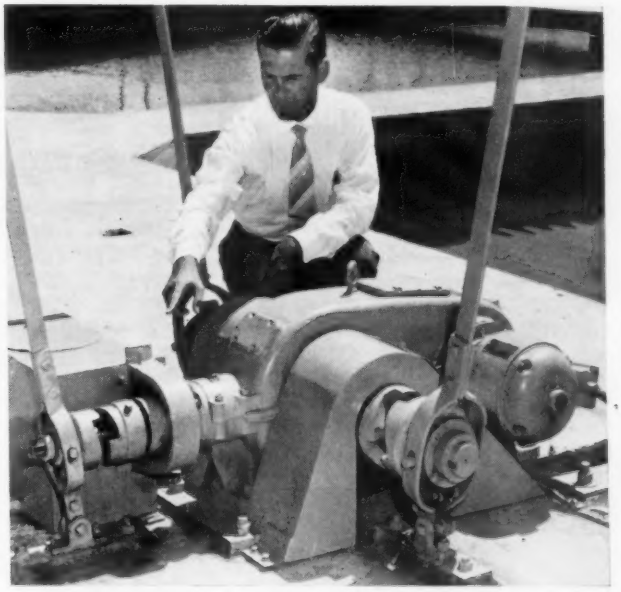
From each bin chemical is drawn into a chemical feeder which adds a predetermined amount to the water as it flows to the coagulation basins. Each of the coagulation basins is equipped with six Link-Belt paddle mixers 8.5 ft. long and 13.5 ft. in diameter.

From the coagulating basins, the treated water flows to a battery of rectangular settling tanks, each of which is 220 ft. long, 37 ft. wide and 12 ft. deep. These are equipped with Link-Belt sludge collectors which operate at a rate of 2 ft. per minute; and with cross-collectors which collect the sludge in a sump for discharge to the Arizona Canal.

The growth of the city has been very rapid—from 65,000 in 1940 to 106,890 in 1950, and to an estimated 140,000 in 1954. The Squaw Creek plant is one unit in a master plan designed to provide for the city's needs to the year 2000. A fuller description of the broad phases of the project appear in the February, 1953 issue of PUBLIC WORKS. In brief, as developed to meet future water demands of Phoenix and its satellite area, this program is based on three steps, of which the Squaw Creek plant and allied facilities are the first. The second step aims at increasing the capacity to 129 mgd by 1970; the third step will provide an overall capacity of 162 mgd by 2,000, at which time the population of the Phoenix area is expected to have reached 400,000. Water will be available from both the present Verde River supply and the Salt River-Arizona Canal.



● **CHEMICAL** mixing tanks in foreground, primary settling tanks in rear, then covered filtration beds and the city.



● **CROSS**-collectors of Link-Belt sludge removal equipment can be operated independently by this spiral jaw clutch.

● **SCREW** conveyors in the chemical house distribute lime or alum to the chemical bins. All equipment is dust-tight; bin level controls signal when bins are filled.

A FUNNEL TYPE

NORMAN W. NESTER, Civil Engineer, Physical Plant Department, and
JOHN C. GUILLOU, Research Assistant Professor of Hydraulic Engineering,
University of Illinois

IN MOST municipalities, the collection of surface runoff is accomplished with a system of street gutters and underground conduits. Normal runoff from streets, sidewalks, alleys and other hard surfaces is collected to the gutters for transport to the storm sewer system. Economical design of a stormwater collection and removal system is predicated on the rule that small rates of runoff can be conveyed as surface flow. When the rate of flow reaches a maximum desirable quantity, an inlet device is provided to remove the flow from the gutter and lead it to the underground sewer which transports the runoff to the point of disposal.

Early designs for stormwater collection systems included a catch basin type of inlet structure. This structure was intended to intercept the surface flow and also prevent objectionable solids from entering the sewer system. With the increased trend toward hard surfacing of streets and high runoff building areas, there developed a tendency toward installation of inlet structures which did not act to separate solids from the stormwater.

Since most cities now require the surfacing of streets before accepting either new subdivisions or new areas for incorporation, there is little need for a catch basin type of structure in the modern street drainage system. Undoubtedly, there are situations in the surface drainage field which require separation of solids from stormwater, but this is not the normal situation.

While both catch basins and inlets serve as openings for the entry of stormwater to the disposal system, the function of the two structures differs very materially. The catch basin function includes not only the interception of surface runoff and the elimination of floating debris with an inlet grate, but also the effective desilting of such intercepted runoff. In the case of the inlet box, the structure functions solely as a means of conveying water from the surface inlet grate to the underground collection system.

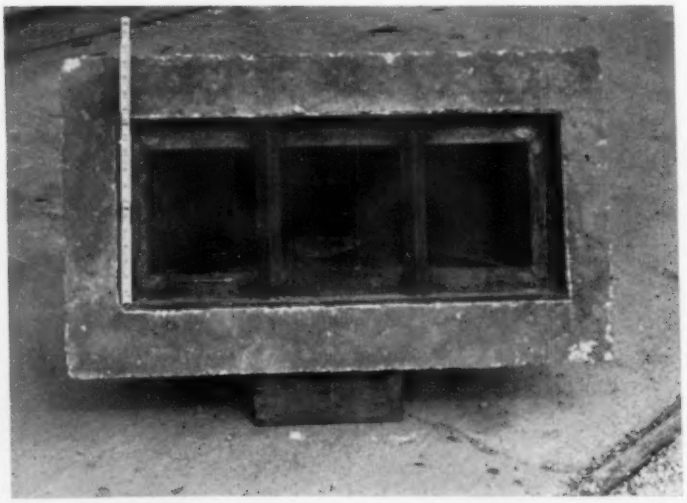
Street Cleaning is Cheaper

Since the catch basin serves as a collection point for debris and solids, it requires routine maintenance, the amount of which depends upon the quantity of precipitation and the frequency of street sweeping and gutter cleaning as well as upon the characteristics of the area served. Catch basin efficiency is therefore dependent to a great degree on the amount of preventive maintenance performed on streets, as well as in the basin structures. Too frequently, preventive maintenance of storm sewers and appurtenances is neglected until curative measures are necessitated. There is a tendency, particularly in the smaller communities, to postpone and delay street cleaning and thus permit debris to accumulate in the collection system. The cost of removing debris from underground sewer structures far exceeds the cost of removal from street surfaces.

Frequent clogging and high costs of maintenance are but two of the factors which are responsible for the abandonment of catch basins and the resultant trend toward utilization of simple inlets at runoff collection points. (PUBLIC WORKS, May 1954, p. 106.)

Almost all inlets now used exhibit a rectangular cross-section with a horizontal floor. Many have inadequate and impractical inlet grates or entry openings. The inlet box that is poured, or installed, in place, constitutes an expensive and time consuming construction

● **FUNNEL inlets are poured upside down for simplicity. Photo at left shows inside form and reinforcing mesh in place on pallet. A small amount of concrete is required in the cast.**



● **INLET casting after removing outside form and anchor assembly machine bolts. Block inlet in upside down position, and drive inside form out of casting. Operation time 3 mins.**

Stormwater INLET

procedure. Because of the excessive cost and the lack of efficiency exhibited by most cast in place inlets, there has been an increasing need for a precast inlet which would efficiently handle runoff, be reasonsably light in weight, and be economical to produce.

Building a Better Inlet

The Hydraulic Engineering Laboratory and the Physical Plant Department of the University of Illinois began, in 1952, the cooperative development of a precast inlet which would meet the general hydraulic requirements necessary for drainage work and would also be light in weight and economical to manufacture.

The first model of this funnel-type inlet was cast in plywood forms. The inlet had a wall thickness of 6 inches and an anchored structural steel angle which served as a seat for the inlet grate. This original design was not entirely satisfactory, and a number of refinements have been made to reduce weight, time of setting and cost of construction. The angle seat for the inlet grate was eliminated and the wall thickness was reduced to four inches. Original reinforcing rods were replaced with wire mesh. The inlet, with a precast elbow, can be installed in one continuous operation. Forms are made of 16-gauge black iron. This material produces a smoother finish, permits easier removal of the casting and is durable. After a number of pours the forms show no appreciable deterioration.

Construction Methods

The forms are placed on a pallet and locked in place with pins which retain the forms in place laterally and also prevent flotation during the placement of concrete. After the inside forms are in place on the pallet the core of reinforcing mesh is placed and wired to the pipe sleeves and bolts. The pipe sleeves and bolts, which were connected to the inside form before placing in the pallet, are cast into the concrete to facilitate handling of the casting. They are temporarily held in place, during the concrete pour, with machine bolts. Hooked bolts are used in the pipe sleeves during transportation and to aid in handling during placement of the casting.

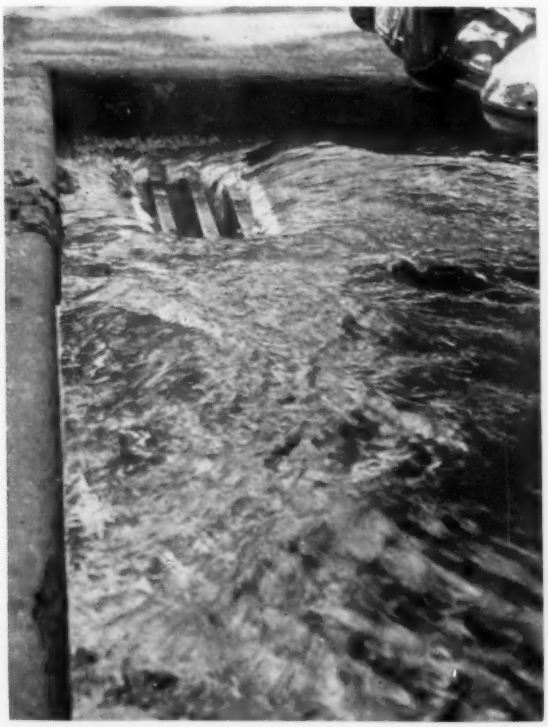
After the placing of reinforcing mesh, the form is filled with concrete which is placed and vibrated in stages. Because of the limited quantity of concrete required for the casting, smaller amounts of ready mixed concrete, surplus to other jobs, may be used further reducing the cost of the inlet.

Cost of construction of the inlet excluding form cost, is about $8.00. Installation cost is approximately $9.00 per unit. Considerable study has been given to the selection of a grate for use with the funnel inlet. The grate which has proven most satisfactory, and which is sturdy enough to support traffic loads is a cast iron, parallel bar inlet grate such as Neenah R-3284B, or equivalent. This grate has no bars perpendicular to the direction of water flow. The openings permit free entry of stormwater with small suspended debris, but restrict the entry of the larger material which could cause stoppage in the sewer. The grate is twelve inches wide and thirty inches long and has an open area of 1.34 square feet. Inspection of inlets already installed indicate that all debris passing the grate will also pass through the funnel and elbow without stoppage.

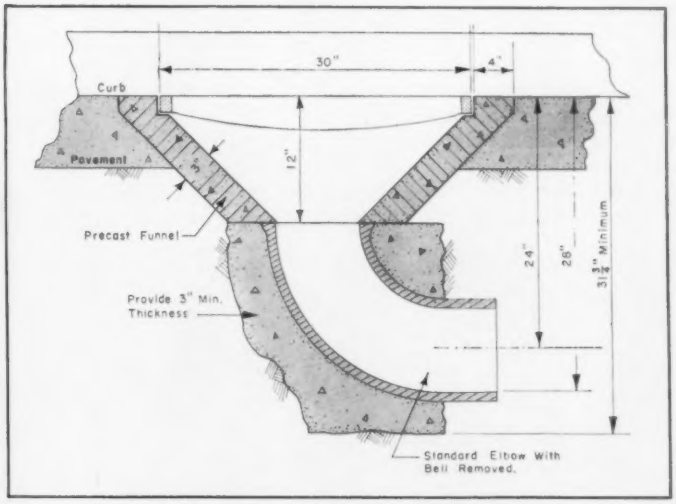
Test Results

Extensive laboratory and field tests have been completed on the funnel-type inlet. They indicate that the structure will efficiently handle flows in excess of 2.8 cubic feet per second. Flows may enter from four sides of the grate if the edge of the casting is against the curb. It

(*Continued on page* 144)



● **STORM water being handled quite readily by a funnel grate is shown in the photo at left. Tests indicate the capacity of funnel inlet in flow is in excess of 2.8 cubic feet per second.**



● **TYPICAL section of a funnel inlet with a standard elbow with bell removed is shown above. No forms are needed on the project to put this type of storm drainage inlet in operation.**

Highway Planners

● TRUCK passes over scale platform, which is scarcely visible in pavement slab.

STUDY ELECTRONIC SCALE RESULTS

HIGHWAY planning engineers are interested in research data being compiled by the Oregon and Iowa highway departments through the use of electronic highway scales. These installations of a device developed by the Cox and Stevens Division of Revere Corporation of America, followed an extensive experimental use in Virginia of the scales by the U. S. Bureau of Public Roads. In that project, weights recorded electronically while trucks were in motion were compared with static weights determined for the same vehicles by the lever-arm scales the Virginia department of highways operated near Woodbridge, Va.

Results shown by the electronic scale, according to O. K. Normann, chief of the traffic operations section of the Highway Transport Research Branch of the Bureau, were "sufficiently accurate to obtain necessary information for highway planning purposes". He estimated that the average error is only two percent; and, he added: "Any distribution of axle loads or total vehicle weights obtained by using the electronic scale while vehicles are traveling at their normal speeds will be identical with similar distributions obtained by stopping the vehicles and weighing them on an accurate static scale."

It was shown that the accuracy of recording not only weight but speed and axle spacings is sufficient both for highway planning purposes and for the calculation of legal loads in states where axle weight limits vary with the spacings between axles. Speeds can be measured to within one or two miles per hour and the average error in axle spacing when compared with taped measurements is under six inches.

The scale consists of a platform, 3 ft. by 10 ft., supported by four electronic load cells. In addition to showing truck weights, speeds and axle spacings, the remote recording device also shows the number of vehicles using the road.

More Research Promised

R. H. Baldock, state highway engineer of Oregon, says the scale should enable his department to do pioneering in highway research, and he cited its advantages from the viewpoint of truckers. Before the scale was installed on the Wilsonville highway near Hubbard, Ore., weighing trucks for highway planning and design purposes involved stopping vehicles. Truck operators often object to being delayed at weighing stations and may use circuitous routes to avoid the stations, even when no law enforcement is involved and the data are used only for highway planning. Mr. Normann also pointed out the time loss to truckers in static weighing: "The weighing of commercial vehicles is a much more commonplace operation that it was a few years ago. Today it is not unusual for the same truck to be weighed several times with the same load on a single day's run."

The electronic scale eliminates those time-consuming stops. The trucker doesn't even know his load is being weighed. The weighbridge is visible only as another crack in the pavement. Passing vehicles activate the mechanism which notes its findings on a remote recorder.

Other uses of such electronic scales may develop, including measuring of impact caused by surface roughness or uneven tire wear; the efficiency of truck suspension systems in reducing impact loads; and variations between wheel loads, especially on tandem axles.

● ELECTRONIC weighing cells in vault beneath the inset concrete slab register individual axle weights of vehicles.

● TRAFFIC research engineer reads the tape that records axle spacings, axle weights and the speeds of moving trucks.

STRUCTURAL PLATE BRIDGE FLOORING *ELIMINATES* SHAKE, RATTLE and ROLL

H. C. MABRY, County Engineer, Limestone Co., Ala.

OUR COUNTY has done a pretty good job of getting the people out of the mud but still has much to be desired toward keeping them out of its creeks and branches. The abundance of water in the form of tributaries to the Tennessee River involves many and varied problems in drainage structures. The funds available for our highway program are not large enough to keep pace with the needs for replacement of, or improvement to, our many old or, we might say, antique bridges.

There are, however, some old structures in the County with adequate foundations and steel I-beam spans that have wood floors. The continual replacement and repairs to this flooring places a drain on County Funds that deters permanent improvements.

After searching for some practical method to replace this continual pouring of money down the drain on wood floors, Mr. Le Croix, Board Member in District 3, decided that two bridges in his district should be refloored with structural plate bridge flooring on a trial basis. Accordingly, an order was placed with Choctaw, Incorporated, for 2562 square feet of structural plate bridge flooring.

Cost data on flooring these two bridges, one spanning Riley Creek and the other Mud Creek are given below. The Riley Creek bridge is 79 ft. long and 18 ft. wide and the Mud Creek Bridge 60 ft. long and 18 ft. 11 ins. wide. Stringer spacing varies from 19½ to 25½ ins. on centers. Total surface area is 2562 sq. ft.

For removing the old floor and painting the stringers, 156 hours of labor at $0.75 per hour and 12 gals. of paint at $4 per gallon were required. Total cost for this phase of the work was $165.00, or 7 cents per square foot.

For installing structural plate flooring, the labor of a welder for 46 hours at $1.00 per hour and of a helper for 50 hours at 75 cents an hour, plus 20 hours of truck time at $2 per hour were required. Total cost was $123.50, or 5 cents per square foot.

The structural plate flooring was furnished by United Steel Fabricators, Inc., Wooster, O. This was 12-gauge and cost $1.06 per sq. ft. Other costs for placing flooring and welding amounted to $71.46, giving a total cost for flooring and welding of $1.09 per sq. ft.

The steel flooring was covered with a plant-mix surface course. The required 35 tons cost $5.50 per ton, or 8 cents per sq. ft. Placing the surface course involved the following costs: Labor, 64 hrs. at 75 cents; 12 hours at $1; and 2 hours roller operator time at $1 per hour. Equipment required was a roller, 2 hrs. at $1.55 per hour and truck, 18 hrs. at $2.30 per hour. The total of labor and equipment cost was $106.50 or 4 cents per sq. ft.

The total cost for flooring these two bridges and paving the floor surface amounted to $1.33 per sq. ft. The County Board members have been so well pleased with the results that they are now planning to use the same material on seven other bridges.

On the two bridges already improved, the flooring was arc-welded to each I-beam stringer at welding holes provided in all valleys of the corrugated plates. This procedure stiffened the entire structure and eliminated the objectionable rattle and shake of the old wood floors, as well as the continual maintenance required on them.

● **RILEY CREEK BRIDGE, a 79-ft. long, 18-ft. wide structure, was one of the two bridges on which old wooden floors were replaced with structural steel plates.**

● **VIEW from beneath the bridge shows appearance of the structural plate floor. Flooring was arc-welded to the I-beam stringers at valleys in the corrugated plates.**

HOW COMPRESSED AIR CAN WORK for a CITY

● **STARTING to lay a water main. The first step is to cut cleanly through the hard street surfacing.**

Photos and Data Courtesy Compressed Air and Gas Institute

COMPRESSED air tools have become almost indispensable in street, sewer, water, lighting, police and fire signal, and automatic traffic signal maintenance.

Regardless of the size of the city, all maintenance crews have generally similar problems. Compressed air operated tools in these maintenance jobs can put unlabored motion into a man's hands to make him many times more efficient and relieve him of physical fatigue. No special training is required to use air-operated tools or devices and compressed air can be used anywhere, under all conditions—rain or shine, wet or dry, cold or hot, on or under ground, or even under water. Compressed air exhaust is harmless and colorless, and compressed air tools can be used where explosive gases are present without danger.

"Air" tools, as most people call them, develop great power with little weight, therefore, can be used by hand with comfort. There is no heating when used beyond their capacity, for they can come to a complete stall with no over-load breakdown or burn-out, and will start up again with no ill effects. They can be throttled for regulated control, or can be equipped with torque and speed regulators or air reducing valves for cutting down the air pressure to suit the requirements. Air tools are, therefore, highly versatile.

Street repairs can be made quickly and more economically, for one man with a paving breaker can break up more concrete than six men with sledge hammers and crowbars. In less than a year the savings in labor cost alone will pay for the paving breaker and all the equipment, including the compressor; but the savings goes on year after year.

● **SPADE on the business end of an air tool is a help in trenching.**

Savings in addition to reduced labor costs will accrue by using air tools in street work. If the concrete paving has an asphalt surface, it is necessary only to mark out the section to be removed and the paving breaker equipped with an asphalt cutting tool can follow the line, making a straight cut and removing only enough asphalt to do

the job. Prying up asphalt with picks or crowbars and breaking it with a sledge hammer creates jagged edges and it requires a greater amount of asphalt to replace the surface removed; and the debris to be trucked away is less on an air tool job. Black top roads can also be repaired advantageously with an asphalt cutter making straight cut walls and permitting most effective repair.

Paving breakers are used on many other operations such as driving wood sheeting, driving frost wedges to break up hard or frozen ground, shale, rock, etc. They can also be used for breaking up boulders; large concrete or stone slabs; driving stakes and pins; and breaking up stone, concrete or brick walls. Frozen river channels or drainage ditches that freeze solid to the bottom in the winter have been opened up in the spring with paving breakers to avoid flood conditions.

The clay digger or trench digger is an air tool of much importance in the city maintenance group for it can loosen more dirt with one man operating it than several men can swinging picks. It is the quickest way to open up ditches that the ditch digging machine cannot reach; and to finish up after a ditch digging machine. Clay diggers are also used for tunneling under sidewalks, driveways, streets, trees, alleys and other places. Clay diggers can be used for root removal, digging out the roots so that stumps can more readily be pulled out with a tractor. Equipped with an axe blade, they do more work with less fatigue than can be done with a hand axe. Clay diggers with moil points are used for light concrete breaking and are ideal for demolishing brick for block pavements.

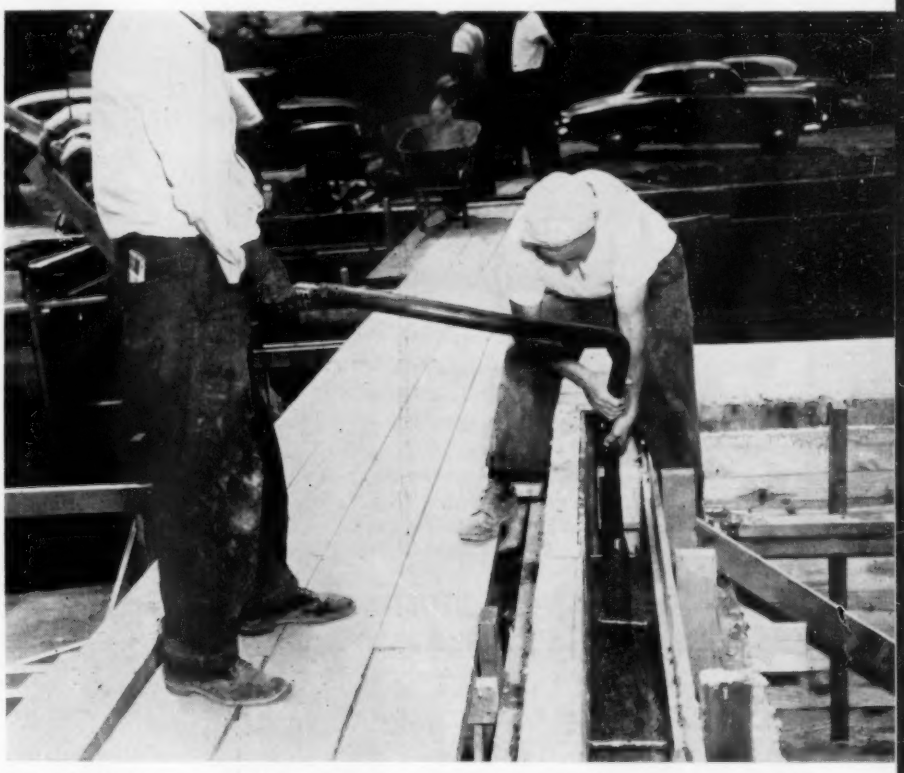
Some Cost Data

Consider man-hours for just one moment: The average laborer will earn $1.50 per hour. If a man, using a clay digger or paving breaker, does only three times as much work per hour as when working with hand tools, he will be saving the labor of two men while using the tools. Estimating the tools are in actual use one-third of the time, he would be saving one-third of the labor of two men or $1.00 per hour, $8.00 per day or $1920.00 per year. This seems a great saving but it is still not enough because actually a man using a clay digger or paving breaker can do more than the labor of two additional men and can work more continuously on hard labor with less down-time for rest periods; and he can work in places where there is not room to swing hand tools.

Back fill tampers are also popular tools for city use. They will tamp back the dirt removed in most any excavation. Tamping the fill avoids the hump on fresh refill and the sinks after the fill is settled in the natural way. Tamping is the only way fill can be replaced in tunneling under sidewalks or driveways to avoid settling afterwards. Tamping around new foundations is often required in specifications to avoid undesirable settlement or the formation of pockets of water beside foundations.

Tampers are now furnished three in a saddle, referred to as triplex tampers. These are operated by one man, economizing on labor by having three tampers working at one time to cover more area at no additional labor cost.

Air sump pumps are often a necessity for pumping water from excavations. A tool that can be carried by one man will discharge over 200 gallons of water per minute against a ten-foot head. Pumping out manholes or basements is also common employment for sump pumps and there is never any danger of electric shock when using air sump pumps. Sump pumps can be used for pumping fluids out of tanks, barges, and boats, and can be used for pumping explosive liquids, such as gasoline and oils. For explosion protection against accidental sparking, brass construction can be furnished when specified.



● **VIBRATING** concrete in forms is a necessity to prevent honeycomb and similar defects in thin wall sections. A pneumatically-operated vibrator is being used here.

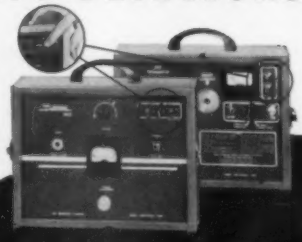
Cement hammers are used for light demolition work where a lighter weight tool is preferred, as for wall or overhead work. Cement

(*Continued on page* 125)

● **TRIPLEX** tamper assures proper compaction and a big saving in time.

It's True There are Other "Good" PIPE DETECTORS

and EACH ONE WILL PERFORM ALL THESE JOBS:
- Detect, trace and center pipes, cables, etc.
- Estimate their depth
- Separate parallel pipes, cables, etc.



Model 505 Pipe Detector

But... Do They Have ALL These "505" Features

1. ALUMINUM CASE shields the loops from outside interference and is light — durable — repairable.
2. BUILT-IN BATTERY TESTERS plus 67½ V batteries insure maximum service, more efficiency, more power.
3. QUICK-ACTION ALUMINUM HANDLE set up in seconds for one man operation.
4. LIFETIME GUARANTEE assuring reliable performance for the entire life of instrument.

Also Available: Model 505-C Combination Pipe-Leak Detector

Get the complete "505" story — write Dept. 55.

Detectron* The DETECTRON Corp.
*Trade Mark
5528 Vineland, North Hollywood, Calif.

BORE with HYDRAUGER
(EARTH BORING MACHINE)

Designed for maximum control of the reamer. Earth along the pilot bits acts as a bearing to steady the reamer assuring an accurate hole.

FREE BOOKLET.. SEND COUPON BELOW

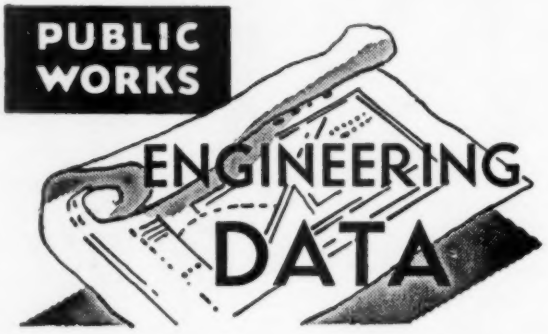
HY-250

HYDRAUGER CORP., LTD. 681 MARKET ST. SAN FRANCISCO

Please send, without obligation to me, the HYDRAUGER BOOKLET which shows relative costs and speeds of BORING as well as specifications of various Hydrauger models.

NAME _____ ADDRESS _____

CITY _____ STATE _____



Special Truck Speeds Work of City Locksmith

A ¾-ton walk-in truck is used by San Francisco, Calif., as the city lockshop. It is a complete portable traveling shop, fully equipped with all accessories such as work bench; key cabinets; tool cabinets; parts cabinets and drawers; a regular size key duplicating machine which can handle almost any type key; a grinder and wire buffing wheel; and a large vise which will handle almost any type of object or material. These units are permanent fixtures in the truck. In addition, it is equipped with small tools and portable electric tools such as drills, soldering irons, etc.

To handle this equipment, the truck has a 1,000 watt AC power unit that is operated by a portable gas engine. This unit is installed so that it can be taken out of the truck for power and repairs. The truck is also equipped with a double throw switch so outside power can be used and a 40-foot self-winding extension cord which is used to bring power in and take power out when a long cord is needed. The switch for this operation is fused so no short or overload will harm any equipment.

This truck was engineered and developed by the lockshop personnel, and the equipment was installed by mechanics in the Department of Public Works.

Radio Telephone Facilitates Highway Maintenance

A complete system of 2-way radio communication was placed in operation last year by the Wayne Co., Mich., Board of County Road Commissioners. While not established exclusively for the Highway Service & Maintenance Division, radio communication greatly facilitated its operations with a subsequent saving of time and expense. The system consists of eight land and 75 mobile stations operated on a single ultra-high frequency of 453.95 megacycles. This frequency has the characteristics of television in that its range is in proportion to the height of the antenna above the ground. It does not lend itself to distance but the quality of the signal and the lack of interference more than offset this apparent deficiency.

The two main stations are located on top of the Cadillac Tower, Detroit, and the water tank in Wayne, Michigan, and are both remote controlled by a dispatcher at the Board's Wayne Shops. They are in service 24 hours per day. The remaining six land stations are operated by clerks at the Board's various yards and are in service only during regular working hours. Mobile units are installed in the vehicles of supervisors, mechanics, and essential service trucks, including maintenance trucks for the Lodge and Ford Expressways.

APWA News

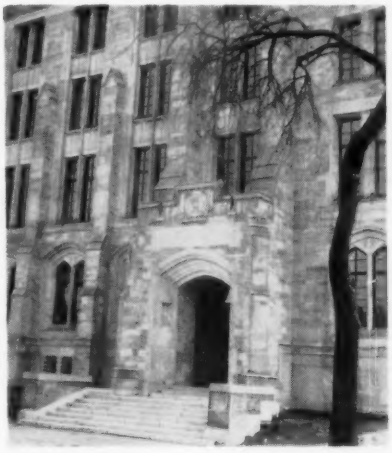
AMERICAN PUBLIC WORKS ASSOCIATION
1313 EAST 60th STREET, CHICAGO 37, ILLINOIS

Membership Climbs 40% in Three Years

The spectacular growth of the American Public Works Association during recent years clearly indicates that public works officials are now lifting their sights to a professional level which offers great hope for the future. The foundation of this fast growing organization was laid in 1894 at a meeting held in Buffalo, New York. The organization formed at this initial meeting was known as the American Society for Municipal Improvements. Its name was changed in 1930 to the American Society of Municipal Engineers. Another association was organized in Chicago, Illinois in 1920 which was known as the International Association of Street Cleaning Officials. Its name likewise was changed in 1930 to the International Association of Public Works Officials.

Since both organizations had many interests in common, they decided to hold a joint meeting in Rochester, New York in 1934. Action was taken at that meeting to establish joint headquarters for the two organizations in Chicago. The joint activities conducted by these organizations during 1935 and 1936 led to their merger in 1937 to form the American Public Works Association.

The activities of the Association are conducted by the Executive Director and the headquarters staff under the guidance of the Board of Directors. Its officers are located on the campus of the University of Chicago. Other organizations of public officials and agencies also maintain their offices in the headquarters building, which is popularly known as "1313". Among these are: The Council of State Governments, American Society of Planning Officials, National Institute of Municipal Clerks; Municipal Finance Officers Association; American Municipal Association, International City Manager's Association, and various other organizations. Suffice to say that the opportunity afforded for instant communication with allied organizations in all fields of government makes this an ideal headquarters for the APWA.



● **ENTRANCE to the Chicago headquarters office of APWA at "1313".**

The membership has grown continually since the merger of the two predecessor organizations in 1937. Today more than 2,800 persons who are directly or indirectly concerned with public works activities make up the membership of this Association. Over seventy percent of the members are top-ranking governmental officials such as Commissioners, and Directors of Public Works, City Engineers, Superin-

President
Warren A. Coolidge

Vice-Presidents
Edward P. Decher W. M. Swietlik
Kenneth K. King Albert G. Wyler

Past President
Milton Offner

Directors
Frederick W. Crane Roy W. McLeese
Raymond A. Williams W. D. Hurst

Treasurer
Robert L. Anderson

Executive Director
Donald F. Herrick

● **REFERENCE library in building is jointly operated.**

● **CONFERENCE room provides attractive surroundings.**

tendents of Streets, County Road Commissioners, and State Highway and Health officers. The balance of the membership is comprised of "Associate" members including representatives of equipment manufacturers, private utility companies, contractors and others interested in the public works field. The fact that membership in the Association has increased by more than forty percent during the past three years indicates that public works officials have great confidence in the future of this organization.

The fundamental objectives of the Association may be summarized as follows: To keep members informed of current developments and trends; stimulate and encourage the advancement of knowledge and the attainment of proficiency in the public works field; enable members to unite their efforts in the study and solution of common problems; provide opportunities for consultation and the exchange of ideas and experiences; and to provide means for professional advancement.

A number of local chapters have been organized to help promote these objectives. State Chapters are actively functioning in Alabama, Arizona, Georgia, Iowa, Michigan, Minnesota, Ohio, Tennessee, Texas, Utah, and Wisconsin. A Regional Chapter has been established covering the New England States, and another was formed in the Canadi-

(*Continued on page* 108)

Chapter Activities

Over 425 members and guests recently attended the Annual Spring Meeting of the **New York-New Jersey Metropolitan Chapter** at Hackensack, N. J. Twenty-one members were awarded certificates for completing a chapter sponsored training course in municipal public works administration. The program featured a talk on street lighting by E. B. Karns of the Westinghouse Electric Corporation and a talk on Hackensack's equipment maintenance policies by Harold V. Reilly, City Manager. Those in attendance also had the pleasure of witnessing the city's famous equipment parade; seeing Bergen County's big new sewage treatment plant and touring the Ralph B. Carter Company plant.

"You Can't do Today's Work with Yesterday's Tools and Expect to be in Business Tomorrow". That was the theme of a unique Tool and Equipment demonstration recently sponsored by the **Southern California Chapter** at Stough Park in Burbank. About 70 instruments and pieces of equipment were displayed and demonstrated at the event. A new earth compacting machine utilizing a vibrating roller was demonstrated for the first time in the United States. An instrument for rapid on-the-job determination of the moisture and density of backfilled areas was also demonstrated, as well as a new method of cutting concrete pipe by using explosive "primercord" developed by the Atlas Powder Company. The all day affair attracted over 400 persons and included an excellent barbeque lunch.

(*Continued on page* 133)

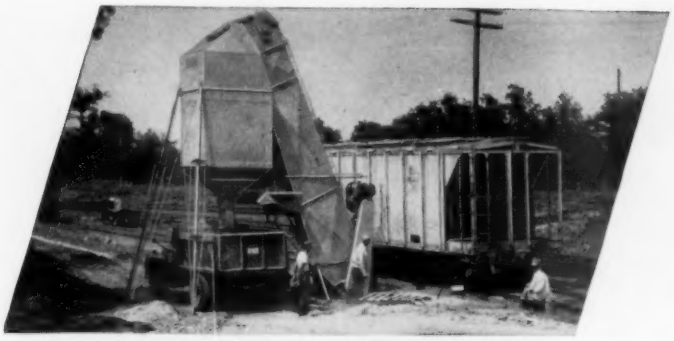
Demonstrations for the Southern California Chapter

● **DENS-O-METER** measures moisture.

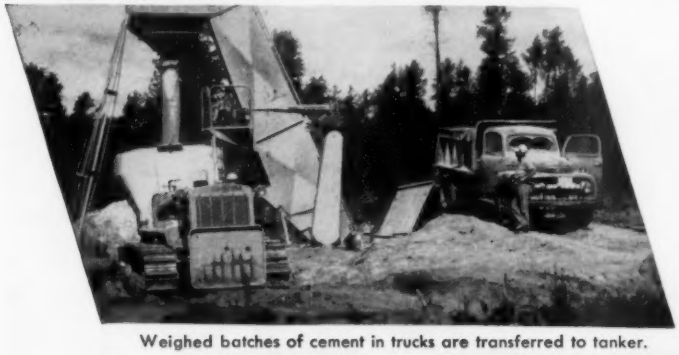
● **GO-FOR-DIGGER** demonstrating its adaptability in digging narrow trenches.

● **COMPACTING** roller-type earth compactor works near a Gradall excavating unit.

● **TRIPLEX** tamper in narrow ditch.



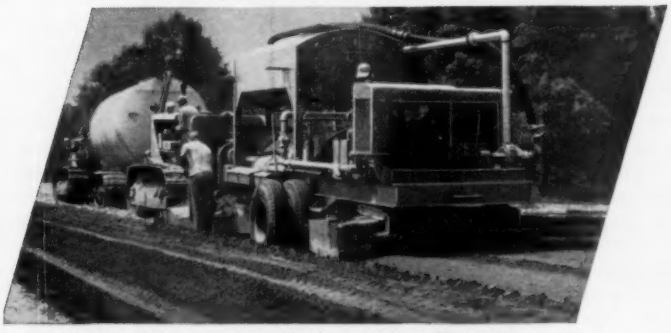
Bulk cement is unloaded mechanically into hopper at rail siding.



Weighed batches of cement in trucks are transferred to tanker.

Crawler treads on the cement tanker carry it through soft sand.

Water tank was also mounted on special crawler carriage.



Mixing train lays a course of soil-cement base 11 ft. wide.

Soil-Cement

solves difficult paving problem and saves $50,000

Wisconsin highway engineers decided something had to be done about an old section of Highway 54. Spring break-up closed it for long periods every year and maintaining it had become a serious drain on highway funds. Extensive study showed that a new road would be the most practical solution.

The new 21.5 mile route—4.5 miles shorter—was cut through sand hills and swamps and paved with soil-cement.* Soil-cement pavement was selected because its rigid base can carry normal loads even on soft subgrade in spring thaws and because suitable material needed for other pavements was not available nearby.

Eliminating the expense of hauling material long distances saved $50,000 alone.

Photos at the left show the simple but ingenious methods and equipment used to facilitate operations in the sandy soil. Despite difficult conditions, paving proceeded at a rate of 3000 lin. ft. per day for the 6-in. thick, 22-ft. wide soil-cement base.

As in Wisconsin, experience in most other states has proved that soil-cement is a logical solution to paving problems for roads not subjected to heavy traffic. More and more, engineers are specifying this low-cost, all-weather pavement for building new highways, for paving shoulders, for widening traffic lanes and for reconstructing old roads.

Soil-cement roads are economical because (1) about 85% of the material is soil on the site, (2) paving is simple and fast, (3) being stronger than other low-cost pavements, it can be built thinner and (4) maintenance is low.

For more information write for free literature, distributed only in the U.S. and Canada.

*Soil-cement pavement consists of soil-cement base and bituminous surface

PORTLAND CEMENT ASSOCIATION
Dept. A7-89, 33 W. Grand Ave., Chicago 10, Ill

A national organization to improve and extend the uses of portland cement and concrete . . . through scientific research and engineering field work

FISHER
M-SCOPE
"ELECTRONIC WITCH"
PIPE-CABLE-FINDER
—LEAK-DETECTOR—

USED AS A PIPE FINDER

USED AS A LEAK DETECTOR

- Fiberglas Cases
- 50% Lower Batt. Cons.
- Unsurpassed Performance
- Built-in "A" and "B" Battery Checker in Transmitter and Receiver $12.50 Extra.

PRICE ONLY $162.50

- IMMEDIATE SHIPMENT
- WRITE TODAY FOR THE COMPLETE "ELECTRONIC WITCH" STORY.

FISHER RESEARCH LABORATORY, INC.
PALO ALTO CALIF.

Washington news

Presented in cooperation with the American Public Works Association and through the courtesy of the Washington Office of the American Municipal Association.

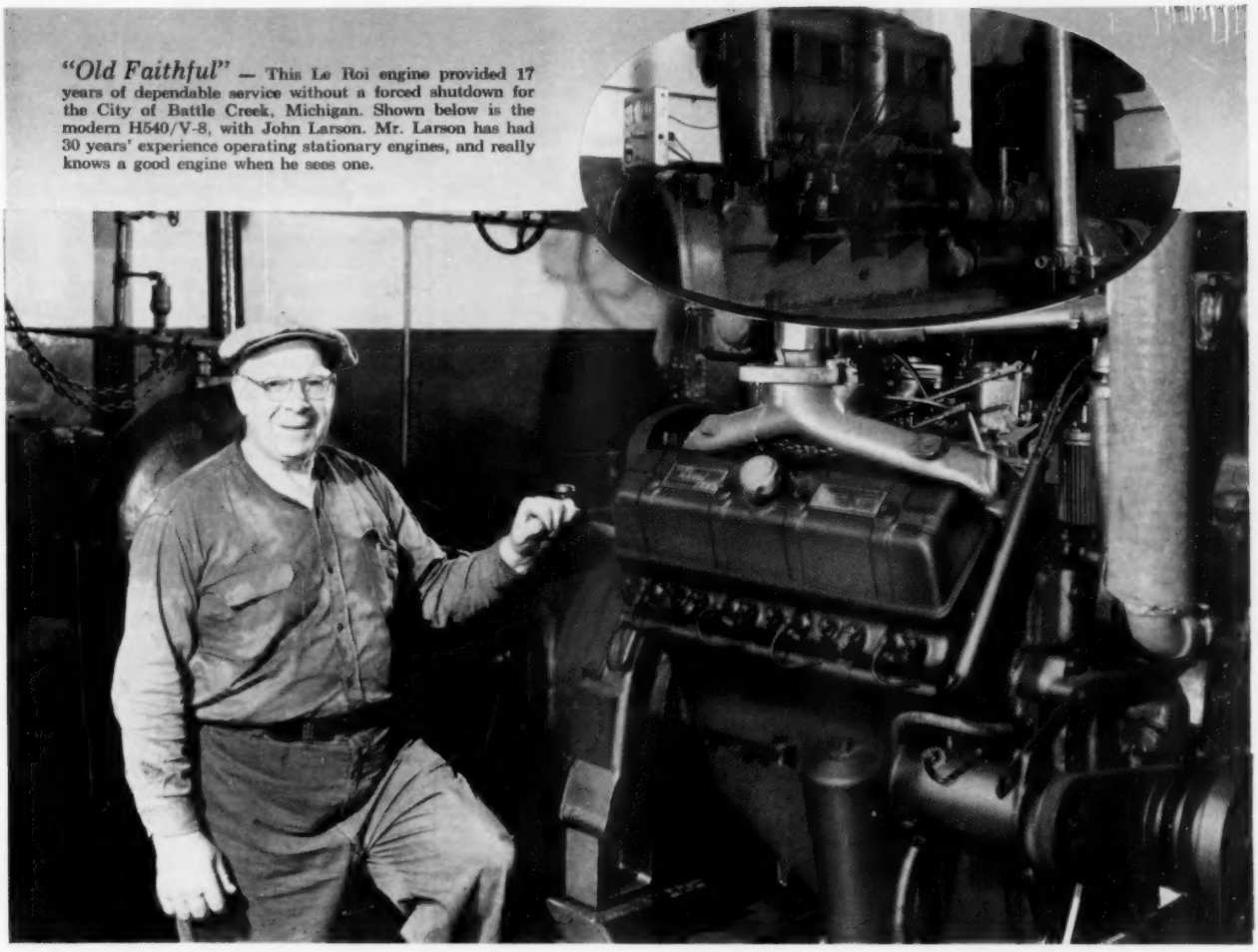
Compromise Highway Bill Shaping Up—While supporters of the Gore program were hailing passage of their bill in the Senate, the House Public Works Committee wound up its extensive hearings on federal-aid highway legislation and is preparing its version of a new road building program that many observers believe will incorporate the principal features of the Clay Committee report. While the Senate has lined up on strictly party lines in rejecting the Administration program the tenor of the House hearings gives support to the belief that the final legislative shake-down will produce a bill that will accomplish a multi-billion dollar speedup of the nation's highway construction program with special emphasis on the 40,000 mile interstate system. While financing of the new program (bonds versus pay-as-you-go) and the proposal to credit states with costs of interstate sections previously constructed have created debatable issues in both houses of congress, one thing seems certain—Congress is prepared to triple or quadruple the present rate of federal spending on highways. One estimate places probable spending on the interstate system at $1,100,000 in 1956, reaching over $2 billion annually by 1960, with the federal government providing 90% of the total cost. A large portion of these expenditures will be made in and near cities.

54 Cities Seek Advance Planning Funds—Qualification statements, a prerequisite to submission of applications for advance planning funds under the program of Reserve of Planned Public Works authorized by the 1954 Housing Act, have been received from 54 cities. The requests total nearly a half million dollars in advances with which to make plans for public works estimated to cost approximately $47 million, according to Commissioner John C. Hazeltine of the Community Facilities Administration. With relaxation of the previously established criteria limiting projects to those involving health, sanitation and public safety, regional administrators of HHFA have been requested to reactivate inquiries and uncompleted applications which had initially been deferred. The first locality to receive approval of a planning advance is Twin Falls, Idaho. Its advance, in the amount of $10,000, will be used for plans of a sewage collection system estimated to cost $1 million.

BPR Memo Causes Controversy—The Bureau of Public Roads memorandum of February 10, 1955 restricting federal aid eligibility on street routes and systems in urban areas has aroused considerable comment. It states that "Effective immediately, the only highways in urban areas eligible for federal aid are urban extensions of the federal-aid primary highway system or approved extensions of the federal-aid secondary system. Urban extensions of the federal-aid primary highway system are continuations of this system into or through approved urban areas, including loops, belt highways and important spurs; all such extensions being of such character as were approved prior to adoption of the concept of federal-aid urban systems as outlined in GAM 331. These urban extensions are free from charge against the permissible mileage of the federal-aid primary highway system.

While this ruling in effect abolishes "urban systems" as such in existing federal highway statutes, the earlier reaction to the BPR memorandum theorized that it would have little, if any, adverse effect on current and future urban projects. This viewpoint was likewise expressed by the BPR but some recent developments, as reported by the cities of Milwaukee and Madison, Wisconsin, indicate that the ruling may cause some new headaches to cities in knocking out certain portions of their street systems from federal-aid support. One unforeseen problem involves the question of aid

Thousands use our Readers' Service card to keep up to date . . . do you?



"Old Faithful" — This Le Roi engine provided 17 years of dependable service without a forced shutdown for the City of Battle Creek, Michigan. Shown below is the modern H540/V-8, with John Larson. Mr. Larson has had 30 years' experience operating stationary engines, and really knows a good engine when he sees one.

122,105.6 hours logged with only four overhauls

. . . dependable performance like this proves the value of Le Roi engines

In 1937, the City of Battle Creek installed its first Le Roi engine. Seventeen years later, when it was time to modernize, this engine had piled up the amazing total of hours shown above.

This is just one more example of Le Roi dependability. It is also proof of the excellent maintenance work performed by John Larson and his staff.

In 1954, "Old Faithful" was replaced by Le Roi's H540, a modern short-stroke V-8. The H540 normally operates at 1500 rpm, but, because of its short stroke V-8 design, piston speed is no greater than that of longer stroke, slower speed engines.

Moreover, the H540 provides new flexibility. This flexibility really paid off during flood conditions when the electric pumps were shorted out. The H540 ran up to 2100 rpm and, by so doing, carried the entire plant load for several days.

Performance during this emergency clearly indicated the advantages of the H540's short-stroke V-8 design. It proved that you get more horsepower per dollar and more horsepower per space. Other plus factors are easier servicing and easier installation.

Whether it's for continuous or standby service, or for pumps, blowers, or generators, it pays to use Le Roi engines. Le Roi power is dependable, low-cost power — power that can help ease the tax load in your community. You can get it in sizes ranging to 645 hp., or in custom generator sets from 50 to 350 KW. Write us for detailed information.

E-103

LE ROI *Division of Westinghouse Air Brake Co.*

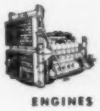
Milwaukee 14, Wisconsin

PORTABLE AIR COMPRESSORS

TRACTAIR

STATIONARY AIR COMPRESSORS

AIR TOOLS


ENGINES

Thousands use our Readers' Service card to keep up to date . . . do you?

Thousands use our Readers' Service card to keep up to date . . . do you?

The Sherman Front End Loader Gives You "REACH YOU CAN USE!"

The "secret" is proper location of the lift frame pivot point. Sherman keeps the bucket in close at grade level for better maneuverability and traction . . . yet extends it to maximum distance from the tractor at loading and intermediate heights for extra loading reach.

This Sherman design feature gives you more usable reach than any comparable machine! It gives you loading height . . . a full 10′10″. And it loads to the front end of an 8′ truck body from the rear. This practical combination of maximum useful loading height plus maximum useful loading reach is further combined with a "balanced design" for the utmost in operating stability.

Sherman's husky main frame transmits loads to the tractor rear axle, giving greater traction and performance. Twin heavy duty tilt cylinders crowd buckets or attachments right in to do a real job on excavating, loading, bulldozing and a score of other jobs. All wear parts are heavy duty . . . designed to stand up longer with minimum maintenance. Two models are available . . . up to 2500 pounds bucket capacity, 4500 pounds breakaway capacity.

The Sherman Front End Loader is economical, easily installed, safe and easy to operate . . . sold and serviced by your local Ford Tractor dealer. Ask him for an on-the-job demonstration today . . . or write for Bulletin 517.

Sherman
PRODUCTS, INC.
ROYAL OAK, MICHIGAN
POWER DIGGERS • FRONT END LOADERS* • FORK LIFTS

*Manufactured Exclusively for Sherman Products, Inc. by Johnson Hydraulic Equipment Co., Minneapolis, Minn.

©1955, Sherman Products, Inc.

eligibility for certain streets, presently outside the corporate limits and classified as federal-aid secondary roads. When annexation procedures bring such a road or street into the city system in its entirety, the connecting link within city boundaries automatically loses its status as an extension of a federal-aid secondary.

Whether the answer to the problem should be sought in an amendment to the pending H. R. 234 (which seeks to codify federal highway statutes) by liberalizing and more clearly defining "urban extensions" to federal-aid primary, secondary and interstate routes or by legislation that would establish a definite "Urban System" for federal-aid purposes is yet to be determined.

• • •

APWA Membership

(*Continued from page* 104)

an province of Manitoba. Sectional Chapters are functioning in the Up-State New York, Northern California, Southern California and in the San Diego-Imperial County area of California. Metropolitan Chapters have also been organized in Chicago, Philadelphia, New Orleans, and in the New York-New Jersey area.

Each year the Association sponsors a Public Works Congress and Equipment Show which attracts hundreds of public works officials from all parts of the country. An unexcelled opportunity is provided, during the four days the meeting is in progress, for the exchange of ideas and the discussion of mutual problems. The Congress programs include lectures, panel discussions, open forums, and informal question and answer sessions. They are so planned that everyone who attends has an opportunity to participate in the discussions and to learn about the latest techniques developed by leaders in the public works field. The Equipment Show is an integral part of the meeting as it enables public works officials to inspect and compare under ideal conditions a wide variety of public works equipment and thus minimize interruptions in the course of their daily operations to learn about new equipment.

Various types of awards are presented at the Congress. One is the Charles Walter Nichols Award of $500.00 in cash which is presented annually to a member of the Association in recognition of outstanding and meritorious achievement in the general field of sani-

Thousands use our Readers' Service card to keep up to date . . . do you?

Thousands use our Readers' Service card to keep up to date . . . do you?

tation. The Samuel A. Greeley Service Award is presented to members who are especially honored for long and faithful service to their cities. A $1,000 Fellowship which is annually made available by the publishers of *Engineering News-Record* for advanced study in public works engineering and administration is also administered by the Association.

Another activity sponsored by this organization is its Research Foundation which provides a means for private industries and governmental agencies to pool voluntarily their financial resources to support extensive research on problems of mutual interest.

One of the privileges of membership is that of requesting information from the headquarters staff on any technical or administrative problem. Immediate access to the Joint Reference Library, which is maintained by the APWA and other organizations located in the headquarters building, enables the staff to furnish promptly reliable information to members requesting such service. Each member receives a monthly Newsletter and a Yearbook containing the name and address of all members. The proceedings of the Annual Public Works Congress, which contains authoritative information on many public works problems are included in the Yearbook. Standard Construction Specifications, Manuals, and Special Reports are periodically prepared by the headquarters staff and committees of the Association and published as a service to members. Any publication which cannot be distributed without cost is made available to members at a substantial discount.

All members of the Association also have the privilege of filing a record of their education and experience with the Personnel Exchange Service which is jointly maintained by the organizations occupying the headquarters building. Such records are made available to public agencies that regularly request the Association to recommend candidates for responsible public works positions. Members are also kept informed of employment opportunities by announcements in the Newsletter.

The annual membership fee is only $10.00 for governmental officials. The service fee for "Associate" members is $25.00 per year. Applications for membership should be sent directly to the headquarters office: 1313 East 60th Street, Chicago 37, Illinois.

"Our Sherman Power Diggers Are Easy to Handle and Maneuver in Tight Places"

One of the two Sherman Power Diggers owned by I. & M. Contracting Co., Bronx, New York, is shown on a trenching job for a public utility company in Long Island City.

Mr. Elio Mazella, co-owner of the contracting firm states: "Sherman Power Diggers are exceptionally good. They are easy to handle and maneuver in tight places. In comparison with former excavating methods, these diggers save us at least 70 per cent."

Sherman's speed, maneuverability and easy operation appeal to custom operators, contractors, utility companies, municipalities . . . everyone who wants the savings of mechanized excavating. Even on the smallest jobs the Sherman is practical, since it releases heavier equipment for bigger jobs . . . yet it digs in a fraction of the time and cost of manual labor.

Use the Sherman Power Digger as deep as 10 feet below ground . . . in mud, hardpan, shale, oiled roads, blacktop and stony ground. Initial cost is surprisingly low, and maintenance is simple and inexpensive. Ask your Ford Tractor dealer for an on-the-job demonstration, or write today for Bulletin No. 518.

*Designed, Engineered and Manufactured Jointly by Sherman Products, Inc., Royal Oak, Michigan. Wain-Roy Corporation, Hubbardston, Mass.

Patent No. 2-303-852
Other Patents Pending

©1955 Sherman Products, Inc.

Sherman
PRODUCTS, INC.
ROYAL OAK, MICHIGAN
POWER DIGGERS* • FRONT END LOADERS • FORK LIFTS
Sherman SP Products®

Thousands use our Readers' Service card to keep up to date . . . do you?

PUBLIC WORKS DIGESTS

The SEWERAGE AND REFUSE *Digest*

Centrifuging Activated Sludge

Sioux Falls, S. D., has been concentrating its waste activated sludge by means of a centrifuge since August 1950, and has found that the one used (made by the De Laval Separator Co.) can concentrate activated sludge from 0.8 percent solids to 5 percent (the greatest concentration that can be pumped), giving an effluent that contains approximately 250 ppm suspended solids, giving a volume reduction of 85 percent. This permits reducing the sludge pumping periods from clarifiers from 20 hr. to 6 hr. per day. The cost of installation for two centrifuge units and the other equipment necessary was $33,143. The annual operating cost, including 15-yr. depreciation, averages $6,830, or $4.37 per ton of solids concentrated. The author considers the benefits derived have justified the cost of operation.

In discussing this paper, a representative of the separator company said that one centrifuge only could handle all the sludge, and that the cost for one centrifuge, with all accessories, would be but $18,950; and that a fair allowance for operating costs would be $250. Also allowance should be made for saving in space required. On the other hand, L. S. Kraus, Chemist of the Greater Peoria Sanitary Dist., presents figures to show that centrifuging at his plant would be much more expensive than the standard methods now employed.

"Concentration of Activated Sludge by Centrifuge". By Leland Bradney and R. E. Bragstad, Chemist and City Eng'r. of Sioux Falls. *Sewage and Industrial Wastes*, April.

Controlling Odors At a Sewage Plant

The sewage plant at Salisbury, N. C., treats a strong composite of dye waste and domestic sewage with BOD ranging as high as 600 ppm. A great portion of the dye waste consists of sulfur blacks and blues. Alum coagulation of these generates a large amount of hydrogen sulfide, which causes a serious odor nuisance. This can be minimized by controlling the pH between 6.6 and 7.2; but as that of the raw sewage varies rapidly between 7.0 and 9.8, such control was impossible with the equipment at hand. The effluent of the primary clarifier showed a fairly uniform pH, but the gas was given off from the clarifier before equalization. The supernatant from the digesters also was high in odor, as were the grit and screenings. Trial of various remedies give little relief until they tried use of "Orthosolv", an ortho dichlorobenzene. This greatly reduces the hydrogen sulfide odors, and also septic odors, with a dosage of 4 ppm. The cost for the chemical averages $5 to $7 per million gallons. The chemical is added to the incoming sewage at the grit chamber. Also it is sprinkled on grit and screenings accumulations. The Orthosolv itself gives off an odor, but not an offensive one.

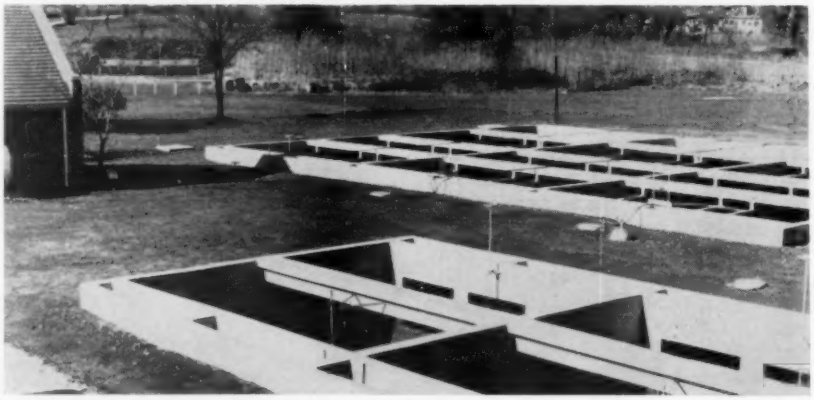
"Controlling Sewage Plant Odors". By John N. Lesslie, Chemist and Supt. *Public Works*, June.

New York's Bowery Bay Plant

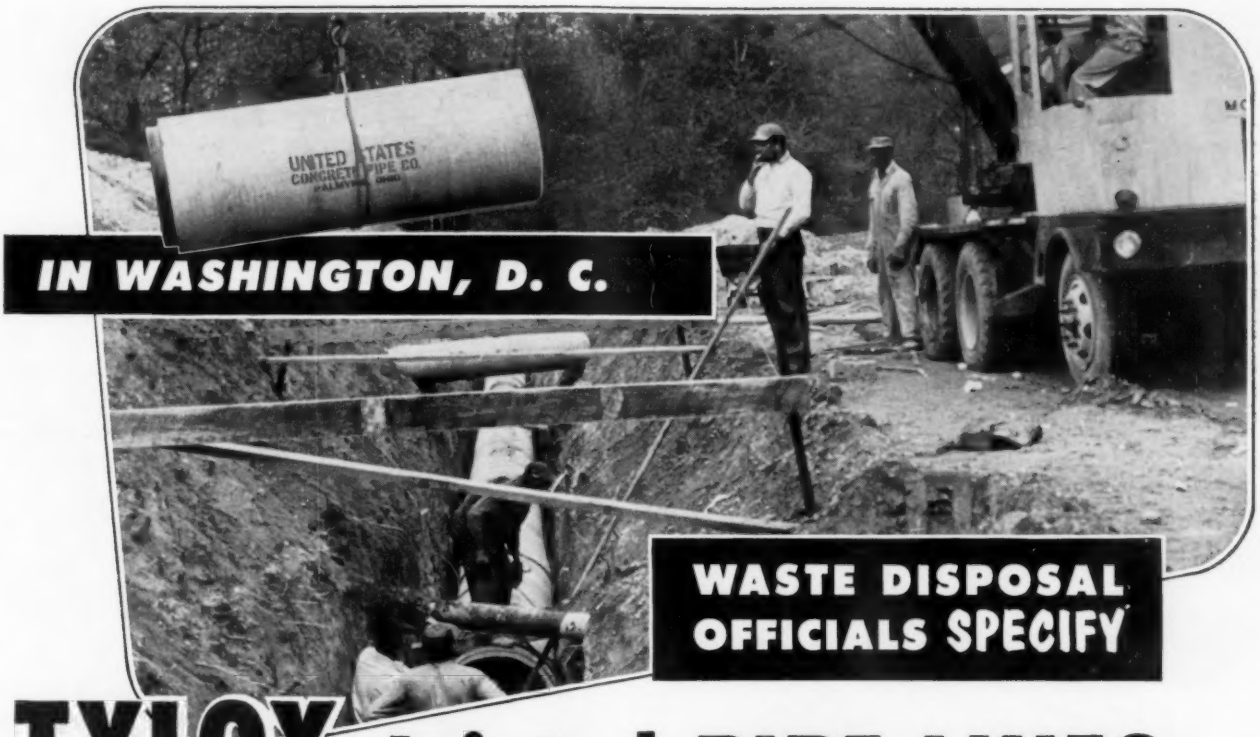
The extension of the Bowery Bay plant, begun in 1954, will be the last major element in a $119,000,000 program started in 1948. It is notable as the first use of radical new design of thickening tanks and sludge digesters, developed by research. The existing plant provides screening with mechanically cleaned coarse and fine racks, pumping, grit removal in rectangular tanks, primary sedimentation, aeration and final settling; sludge thickening and digestion, the digested sludge being barged to sea. The capacity is 40 mgd.

The expansion will increase the capacity to 120 mgd. It will include 2 aerated grit chambers; 6 preliminary sedimentation tanks giv-

Sewage Plant Paints Up and Cuts Annual Repair Bill



A CLEAN-UP, paint-up campaign by the sewage treatment plant in Glen Ellyn, Ill., western suburb of Chicago, has more than paid for itself, according to plant officials. The plant eliminated a sizeable annual repair bill when it covered its poured concrete and cement block structures with two coats of latex-alkyd masonry paint. Before the paint job, dirt was difficult to remove from the masonry, and water seepage and freezing caused cracks to develop.



IN WASHINGTON, D. C.

WASTE DISPOSAL OFFICIALS SPECIFY

TYLOX-Jointed PIPE LINES

TO REDUCE COST—LENGTHEN LIFE OF NEW SEWERS AND DRAINS

More and more city, state and Federal officials concerned with sewerage and drainage construction are specifying TYLOX Rubber Joints for the pipe lines they plan. Washington, D. C.'s new sewers at Kenilworth and Deane Avenues is only typical of this trend. When its designers called for this champion of all sewerage and drainage pipe-jointing materials, they gave the public "most for their waste disposal tax dollar" these three ways:

FASTER PIPE-LAYING—TYLOX-Jointed pipe goes together faster . . . eliminates "wet trench" delays and permits immediate back-filling. Reduces job costs by reducing man hours.

NO JOINT LEAKS—TYLOX Gaskets seal "rubber-tight" under compression. Water can't pass in or out of the pipe to cause pollution or bring on problems with roots or sediment. And naturally-resilient TYLOX **flexes** to protect joints from rupture due to surface loads or soil stresses.

NO CORROSION—Made of specially compounded rubber, TYLOX Joints are immune to sewerage or industrial waste acids and alkalies. TYLOX outlasts the pipe itself.

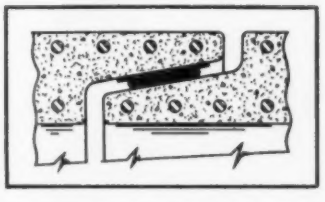
*

LOCATION: Kenilworth & Deane Avenues, Washington, D. C.

ENGINEERS: Sanitary Engineering Dept., Government of the District of Columbia.

CONTRACTOR: J. L. McIlvane Co., Washington, D. C.

PIPE: Vitrified Plate-Lined Concrete Pipe, manufactured by United States Concrete Pipe Company, Cleveland, Ohio.



This rubber-tight mechanical seal stays tight "for the life of the line."

5008

Write today for more details and illustrated performance histories on TYLOX. Read the facts, and assure fast-working, leak-proof and non-deteriorating joints for **your** pipe jobs with a specification for TYLOX RUBBER JOINTS.

HAMILTON KENT MANUFACTURING COMPANY

KENT, OHIO

427 West Grant St. Orchard 3-9555

ing one hour detention; 2 batteries of aeration tanks, giving 2.46 hr. detention; return sludge pumps for step aeration, for modified aeration, and for excess sludge; 8 final sedimentation tanks; 4 sludge concentration tanks; and 4 digesters. In each of these have been included modifications of the existing features due to experience and research. The most notable are in sludge concentration and digestion. The new digestion tanks will have fixed steel covers, each carrying 3 down-draft tube mixers capable of turning over the entire tank contents once an hour. They are designed to receive any or all sludges; to transfer digested sludge to the existing tanks used as secondary digesters, gas extractors or storage tanks; or transfer it to storage tanks or to sludge vessels. The incoming raw sludge will be heated by external heaters. The new expansion is estimated to cost $14,000,000.

Experimental work on concentration tanks was continued after the preliminary plans for this extension had been completed, and the remarkable results obtained led to redesigning, eliminating four of the projected eight digestion tanks, since it was found that the digestion of concentrated mixed primary and activated sludges was proceeding at a higher rate than any they had observed before.

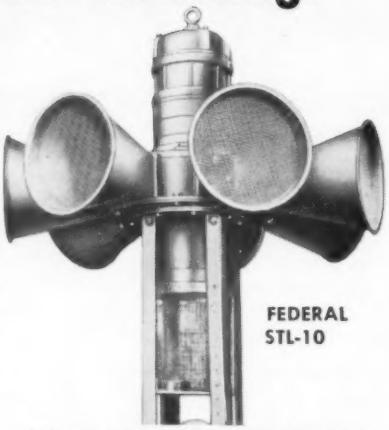
"Bowery Bay Sewage Plant—The Latest Word." By William A. O'Leary, Director of Sewage Disposal. *Engineering News-Reecord*, May 12.

WARNING

FIRE FLOOD TORNADO strike without warning!

The Atom Bomb is not the only, nor the greatest danger to American Communities. This year natural disasters have hit all parts of our country. Many of these areas felt immune to danger, but with nature there is no immunity — no four hour alert — she strikes now! Fast and furious!

Even a few seconds warning can save countless lives. Modern sirens can alert an entire countryside to danger or rally Civilian Defense or other rescue teams to aid victims.



FEDERAL STL-10

FEDERAL THUNDERBOLT

All communities need disaster warning signals. Prepare now! Supplement your existing fire signal with modern sirens like the FEDERAL STL-10 and the FEDERAL Thunderbolt. Blanket your entire community with ample sound to prevent and reduce loss of life. The modern FEDERAL Sirens are designed for air raid, disaster or fire alarm. A vast majority of American Communities are now protected by FEDERAL Warning Signals. If you do not have a complete, modern system — call on FEDERAL for assistance and recommendations. Write today — we can help you!

FEDERAL SIGN and SIGNAL Corporation

formerly: Federal Enterprises, Inc.

8733 S. State St., Chicago 19, Ill.

Now's the time to mail this month's Readers' Service card.

Detecting Gas Leaks at Canton's Plant

At the new treatment plant of Canton, Ohio, the digester building, housing ten digestion tanks, is equipped throughout with spark-proof motors, explosion-proof lighting fixtures and accessories. In addition, there is a combustible gas analyzer and alarm system designed by Mine Safety Appliances Co. This draws air samples continuously from four points to an analyzer which instantly determines whether the methane reaches 40% of the lower explosive limit; if it does, the instrument energizes an alarm hour and a red light, and also ventilator exhaust fans.

"Gas Alarm System Protects Canton's New Treatment Plant." By J. J. Welch. *Water and Sewage Works*, April. See also PUBLIC WORKS, April.

Effect of Recirculation On Trickling Filters

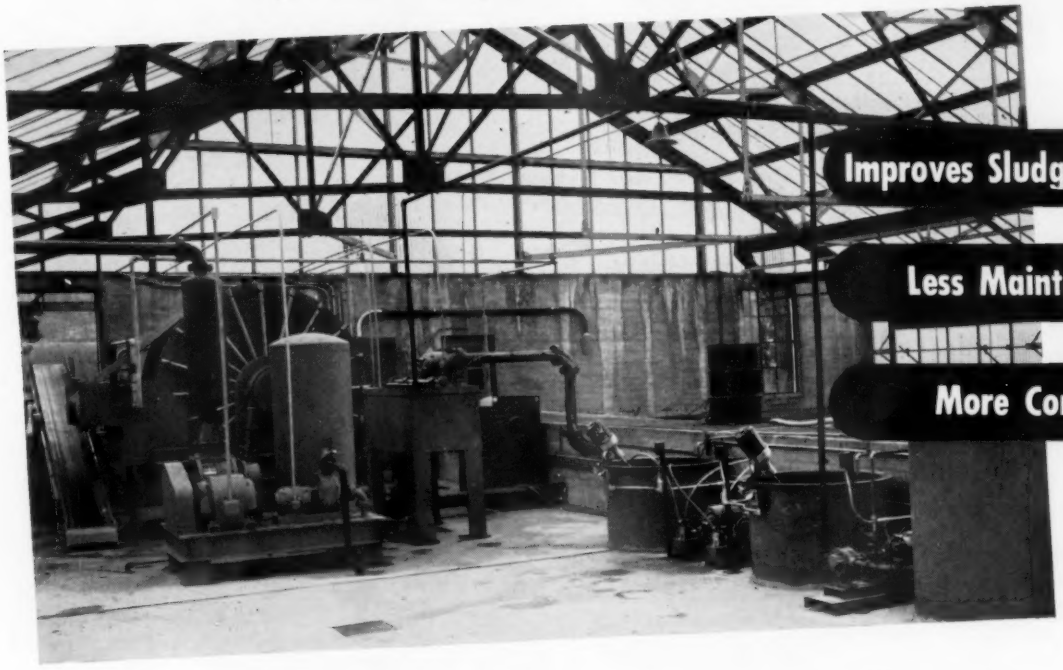
This report is based on experiments conducted at the Texas Engineering Experiment Station using four 6 ft. filters. It was found that, as the BOD loading increased from 400 to 1750 lb. per acre-foot per day, either with or without recirculation, the total amount of BOD removed increased from 300 to 950 lb., the percent removal decreasing from 77 percent at 400 lb. to 40 percent at 1750 lb. Little correlation exists between BOD removal and volatile suspended solids removal. With recirculation, more nitrates are present in the effluent, most of them coming from the recyclate. Organic loading, measured in pounds of BOD per acre-foot, has a significant effect upon filter performance; absolute removal increased in proportion to the BOD loading, but the quality of the effluent deteriorated. The hydraulic rate has a significant effect on filter performance; the BOD concentration in the effluent decreases inversely as the hydraulic rate. Dilution is an important factor in recirculation.

"Effect of Recirculation on Trickling Filter Performance". By J. H.

KOMLINE-SANDERSON

COILFILTER

Replaces glass-covered drying beds



Improves Sludge Digestion

Less Maintenance

More Compact

Graphic demonstration of the contrast between out-moded methods and modern design is shown at the activated sludge plant, Mt. Penn, Pennsylvania, which has an average dry weather flow of 350,000 gallons per day. At this plant a 100 Sq. Ft. COILFILTER has replaced two 75′x 30′ glass covered drying beds. Installation was made right in the old drying beds, as shown above. The COILFILTER assures Mt. Penn of economical, efficient service with a capacity potential to meet increased sludge dewatering demands for years to come.

Mt. Penn plant superintendent Lewis E. (Bud) Klein says: "*Prior to the installation of the COILFILTER in the Spring of 1954, a lagoon was built to dispose of sludge. Digesters were still overloaded; there was little or no digestion. Analyses on sludge withdrawals showed total solids under 2%, volatile total solids as high as 70%. After one year's operation, two days weekly, sludge analyses showed total solids at well over 6% and volatile total solids under 50%. Our COILFILTER speaks for itself.*"

Write for Bulletin No. 103

Consulting Engineers: GILBERT ASSOCIATES, INC.

KOMLINE-SANDERSON ENGINEERING CORPORATION

Peapack, New Jersey

Manufacturers of the* COILFILTER *... the modern sludge vacuum filter

It's a fact . . . our handy Readers' Service card is the way to get new catalogs.

Sorrels and P. J. A. Zellar, Engineers of Experiment Station. *Sewage and Industrial Wastes*, April.

Transportation Around A Large Sewage Plant

The Hyperion Treatment Plant of Los Angeles, Calif. covers an area of over 75 acres, and walking around the plant to perform their various duties consumed much of the time and energy of the operators. So a pair of 3-wheel stakecar scooters were put into service more than three years ago to transport men and their tools, samples, and materials. Later, four 2-wheel and one 3-wheel sidecar scooters and five more stakecars were purchased. When these are operated 33 percent of the time, day and night, the average depreciation is 100 percent in three years. The cost of these nine vehicles was $4,631.74; maintenance and repair have cost $2,479; gas and oil, $1250. The total averages $0.138 per car per hour of operation. The city now is embarking on a program of replacing the present units with ¼ ton, battery-driven cars, the cost of operating which will be lower than that of the gasoline units, and they are very simple to operate. Seven of them are now in use.

"Walking Is Too Costly". By R. L. Rowlin, Mechanical Supt. *American City*, May.

Vacuum Filtration Of Sewage Sludge

The authors collected by questionnaire from 21 cities data concerning their operation of vacuum filters, some of which are summarized as follows: The average sludge digestion time at these plants was about 45 days, ranging from 30 to 90. Elutriation reduces the amount of chemicals required for concentration and lowers the alkalinity of digested sludge. Ferric chloride and lime are widely used as conditioners. Revenue from the sale of sewage sludge seldom equals vacuum filtration operation and maintenance costs. Excluding fixed charges, total unit costs in 1953 of vacuum filtration varied from $7.00 to $13.00 per ton of dry solids. Labor accounts for the largest expenditure in vacuum filtration. The average life of filter cloth appears to be 400 to 600 hours.

"Survey of Vacuum Filtration for Disposal of Sewage Sludge". By James M. Morgan, Assoc. Prof. of C. E., Virginia Military Inst.; and James F. Thomson. *Water & Sewage Works*, April.

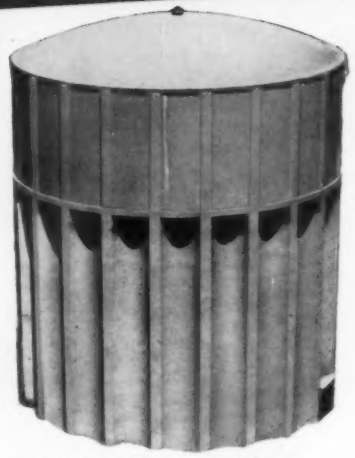
Possibilities of Composting Garbage

The *Technology Review*, publication of the Massachusetts Institute of Technology, under its "Trend of Affairs", discussing the composting of garbage, concludes that: "The composting of domestic garbage converts a foul offensive waste into a stable valuable fertilizer. The process does not cause odor, insect or rodent nuisances. It is safe from the public health standpoint. But whether garbage composting will ever find wide adoption by United States cities depends upon local climates, and also upon financial considerations such as costs of segregating decomposable organic garbage from nonputrescible trash, expense of the composting process, and economics of the storage distribution, and use as fertilizer of the resulting compost." It notes that "Experience in Europe, Asia, and South Africa has demonstrated that domestic garbage can be successfully composted by itself on a large

PRELOAD experience

Now yours in a new way!

Our new policy of centralized engineering in combination with qualified local licensee contractors inaugurates a new era in successful tank construction. Most of these licensees also employ former Preload superintendents, insuring reliable performance and superior jobs.



2-million gallon prestressed concrete tank on 83' tower at Dallas.

ADVANTAGES TO YOU

- 20 years of Preload experience in designing and building over 1,000 water tanks, with over 1 billion gallons of storage capacity.
- Maintenance-free structures.
- Aesthetic possibilities unmatchable by other materials for architectural treatment.
- Experience all the way, from design to construction, by local licensed contractors.

PRELOAD through its own sales engineers or through the licensees is available for consultation. Technical data and literature available on request.

PRELOAD TRADE MARK

The Preload Company, Inc.
211 EAST 37th STREET
NEW YORK 16, N. Y.

Now's the time to mail this month's Readers' Service card.

THE SUN'S HEAT AND GIANT REFLECTORS may convert cosmic energy into power that will propel space ships to distant planets.

100 years from now...

WE MAY "SIGHT SEE" ON MARS

A century from now, when undreamed-of marvels transform our way of life, civilization will still rely on one familiar public servant: the cast iron pipe laid today will continue to carry water and gas to the homes of the future.

Proof? 69 American cities and towns are still using cast iron water and gas mains over a century old. And today's modernized cast iron pipe . . . centrifugally cast and quality controlled . . . is even stronger, tougher, more serviceable.

U.S. Pipe is proud to be one of the leaders in a forward-looking industry whose service to the world is measured in centuries.

U.S.
cast iron
PIPE
FOR WATER, GAS, SEWERAGE AND INDUSTRIAL SERVICE
CAST IRON

U. S. PIPE AND FOUNDRY COMPANY, General Office: Birmingham, Alabama

A WHOLLY INTEGRATED PRODUCER FROM MINES AND BLAST FURNACES TO FINISHED PIPE.

Need more facts about advertised products? Mail your Readers' Service card now.

scale." As a fertilizer, such compost provides nitrogen, phosphorus, potassium, and trace elements to promote plant growth, and improves the physical texture of agricultural soils, increasing water retention, and fostering development of extensive root systems.

"Disposal Proposal." *Technology Review,* May.

Reliability of Plant Operation

Failures, mechanical and electrical, are possible in any treatment plant. Some are of minor importance, some might be a major catastrophe. Responsibility for preventing them lies with those who design the plant and those who provide the equipment, as well as those who operate the plant. The authors in this article consider only electrically operated equipment, which today covers almost all of it.

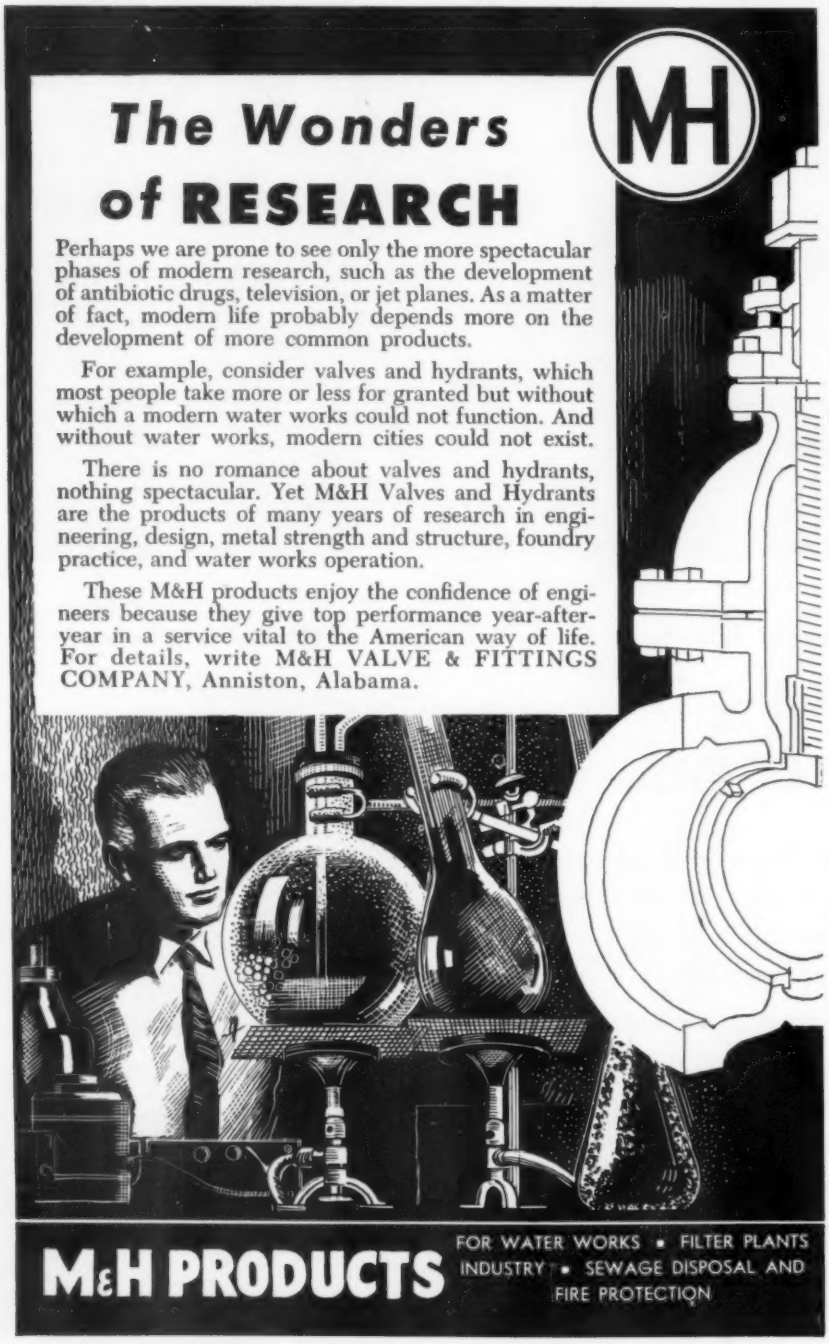
Most important is continuity of the supply of power. The electrical utility which is to supply it should be consulted and informed of the time of power outage allowable for the plant without serious consequences. Consultation with many engineers, managers and equipment suppliers provided the basis for a tabulation of their opinions as to the power outage times which would be allowable for each type of equipment. "Not critical" was their opinion as to equipment for conditioning, drying and other treatment of sludge, chlorination and lighting. On the other hand, even a few minutes' interruption of operation of the blowers might cause serious clogging of the diffuser media. Sedimentation tank collectors are given allowable outage times of 1 to 16 hours, due to possible jamming of machinery and effect on the quality of the effluent.

All provisions for increasing reliability consist fundamentally of duplicate or alternate power channels around possible points of trouble, from duplicate service from the power company to duplication of minor items of equipment. Plans relating to reliability contemplate that good quality equipment will be purchased, that the material will be competently installed, and that an adequate maintenance program will be followed.

"Electric Power Reliability in the Sewage Plant". By N. L. Hadley and E. D. Potthoff, Gen'l Electric Co. *Sewage and Industrial Wastes,* April.

Sulfur Compounds In Activated Sludge

Small amounts of reduced sulfur compounds may be present in domestic sewage, and industrial wastes may contain high concentrations of them. A series of activated sludge experiments was performed at Rutgers University to determine the transformations and effects of various reduced sulfur compounds in sewage treated by that process. It was found that activated sludge may be acclimatized to oxidize up to 500 ppm sulfite sulfur to sulfate within 6 hr. aeration, and up to at least 1,000 ppm within 24 hr.; to oxidize at least 100 ppm sulfide completely to sulfate within 6 hr. aeration; to purify sewage containing 25 ppm sulfide, (50 ppm can be tolerated for about a week); to remove up to 750 ppm thiosulfate sulfur from solution within 6 hr. aeration, of which up to 250 ppm may be oxidized completely to sulfate. The oxidation to sulfite is dependent upon the quantity of air supplied, acclimatization, and the time of contact. Sulfite is not toxic to activated sludge, but when it has been completely oxidized, purification follows. Elemental sulfur is formed by the addition of 1,000 ppm


The Wonders of RESEARCH
Perhaps we are prone to see only the more spectacular phases of modern research, such as the development of antibiotic drugs, television, or jet planes. As a matter of fact, modern life probably depends more on the development of more common products.
For example, consider valves and hydrants, which most people take more or less for granted but without which a modern water works could not function. And without water works, modern cities could not exist.
There is no romance about valves and hydrants, nothing spectacular. Yet M&H Valves and Hydrants are the products of many years of research in engineering, design, metal strength and structure, foundry practice, and water works operation.
These M&H products enjoy the confidence of engineers because they give top performance year-after-year in a service vital to the American way of life. For details, write M&H VALVE & FITTINGS COMPANY, Anniston, Alabama.
MH
M&H PRODUCTS
FOR WATER WORKS • FILTER PLANTS INDUSTRY • SEWAGE DISPOSAL AND FIRE PROTECTION
Get full details of this month's products . . . mail your Readers' Service card today.

thiosulfate sulfur to activated sludge, and this elemental sulfur is absorbed by the sludge.

"Transformation and Effects of Reduced Sulfur Compounds in Activated Sludge Treatment". By Donald B. Aulenback and H. Heukelekian, Rutgers Univ. *Sewage and Industrial Wastes,* April.

Sanitary Fill and Ground Water

The effect of sanitary landfill on the ground water in the vicinity has been under investigation since July 1952 by the University of Southern California. The study was conducted at a dump operated by the City of Riverside for 30 to 35 years, since 1948 as a sanitary landfill. The strata underlying the fill consist principally of medium to coarse sand and gravel containing thin clay layers. Samples were taken periodically of water in a large number of both shallow and deep wells. Conclusions reached were that a sanitary landfill, if so located that no portion of it intercepts ground water, will not cause impairment of the ground water for either domestic or irrigational use. But if the fill is in intermittent or continuous contact with ground water, it will cause that in the immediate vicinity to become grossly polluted and unfit for domestic or irrigational use; dissolved mineral matter entering the ground water will travel in the direction of flow, and diffuse vertically to a limited extent, but not more than 100 feet and will be subject to dilution which will minimize the effect of the dissolved minerals. Where the pollutional load on the ground water is light, the most serious impairment of the water as little as a half-mile down stream from the fill will be an increase in hardness, and then only in the upper portions of the aquifer. Rainfall in the Riverside area will not penetrate a landfill 7.5 ft. thick sufficiently to cause leaching into the ground water.

"The Effects of Sanitary Landfill on the Ground Water at Riverside." By Robert C. Merz, Assoc. Prof., Univ. of So. California. *Western City,* April.

Other Articles

"Two-Stage Operation of **Activated Sludge Plants.**" Advantages and disadvantages. By Karl Imhoff. Sewage and Industrial Wastes, April.

"Flow Measurement in Sewage Works." Third installment. By Walter H. Brown and George E. Symons. Sewage and Industrial Wastes, April.

weil Super HEAVY DUTY Sewage Ejector

• SCREENLESS
• RUGGEDLY BUILT
• NON-CLOG IMPELLER

THE ECONOMICAL SEWAGE PUMP with the *NON-CLOG impeller!*

This WEIL Screenless Heavy Duty Non-Clogging Sewage Ejector is ruggedly built for years of trouble-free operation. WEIL Pumps of this design are still operating satisfactorily after 25 years of service.

This unit is completely factory assembled, economical to install — only one piping connection is required. Preassembly and factory testing insure LESS installation time and no "call-back" servicing.

Inherent in the design of this pump is an ample reserve of strength to meet the most severe conditions. The ease and simplicity of installation and the record of many years of trouble-free operation make this pump the logical choice with the engineer, contractor and owner.

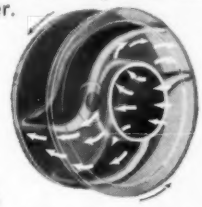


Fig. C-9001

This Two Blade NON-CLOG Impeller is the most important part of the screenless non-clog sewage pump. Not only does it effectively handle large diameter solids but it also passes rags and stringy material of various lengths which are washed into the sewage pit. Pumps with this impeller successfully handle difficult pumping jobs such as waste from public toilets, canning plants, hospitals and industrial installations.

Fig. C-9021

This rugged pump casing with wide waterways permits unobstructed passage of the maximum solids handled by a non-clog impeller.

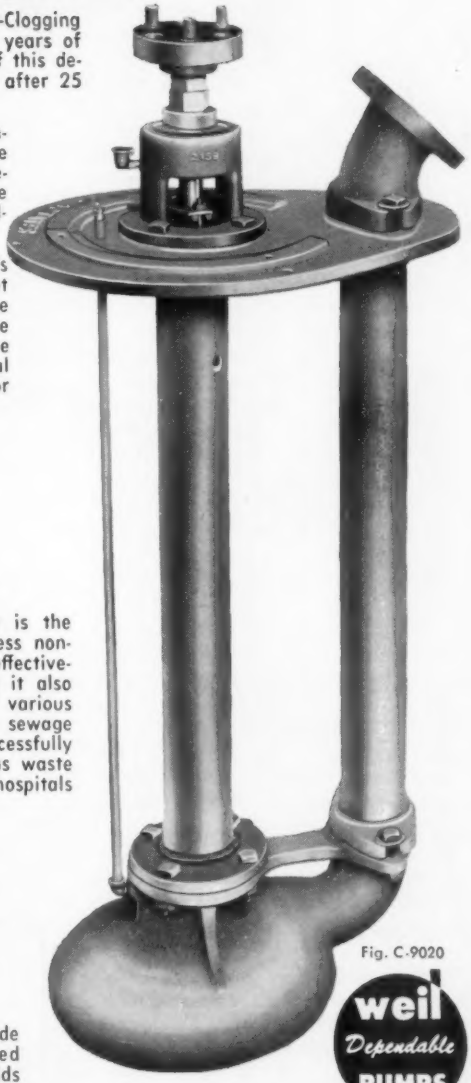


Fig. C-9020

weil Dependable PUMPS

Send for NEW Bulletin C-900 E

weil PUMP CO.

1526 A NORTH FREMONT STREET • CHICAGO, ILLINOIS

Thousands use our Readers' Service card to keep up to date . . . do you?

PUBLIC WORKS DIGESTS

The HIGHWAY AND AIRPORT Digest

Drilling for Horizontal Drains

The highway department of California finds the prevention of landslides one of its most important and most difficult features of construction and maintenance. Most of these are of the "slump" type, of which ground water is a major contributing factor. Interception and removal of this water is extensively effected by the installation of horizontal drains — 2-in. perforated pipes placed in drill holes bored into the slope 100 to 300 ft. No drill rig could be found on the market which met their requirements. These were a unit complete with a gasoline engine of adequate power; a suitable transmission to permit control of speed of rotation over a wide range; a hydraulic feed with a minimum stroke of six feet, capable of exerting a 4,000-pound thrust; provision for slowly rotating the casing concurrently with the jacking operation when necessary; a chuck readily interchangeable for A-rod, N-rod or casing and so designed that long lengths of rod or casing can be operated through the chuck; rugged but easily operated spuds for maintaining alignment and grade of the drill; rubber-tired wheels and three-point suspension to permit sharp turns; and, finally the over-all length not to exceed 12 feet and the weight of the complete drill to be not more than 3,000 pounds. The department designed and built such a machine, comprised of standard or proven parts, which is described in the article.

"Horizontal Drill ". By A. W. Root, Supervising and Research Engr., Calif. Div. of Highways. *California Highways,* April.

Concrete Pavement Joints in Holland

In constructing concrete pavements, Holland engineers place a concrete slab or sleeper beam 4 ft. wide and 6 in. thick under each expansion joint. Before applying the concrete pavement, the foundation is covered from end to end, including the sleeper beams, with a continuous layer of water-tight paper. Before this paper is laid, the sleeper beams are given two coats of an asphaltic emulsion. The pavements are constructed in two layers. In placing the bottom layer, a wooden box is placed at the site of each joint and removed when the concrete is stiff, leaving an open channel, in which a joint board is carefully placed and secured in a vertical position. The channel is then filled with concrete and the top layer of concrete placed.

(Editorial note: All these details were tried in the United States during the early years of concrete paving, but generally abandoned several decades ago.)

"Design and Construction of Motorways in Holland". By J. C. N. Ringeling. *Highways and Bridges,* April 13.

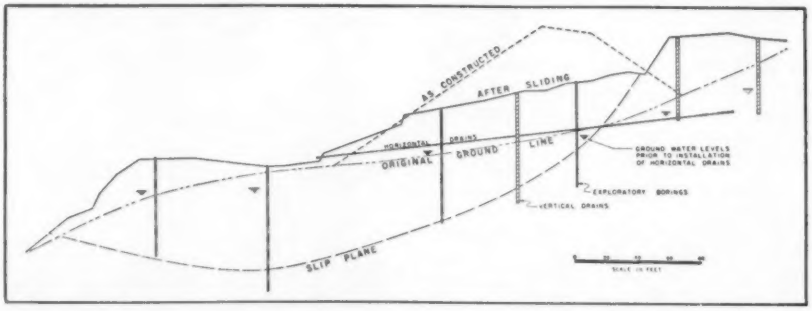
Use of Small Vibrating Screeds

The English Road Research Laboratory has conducted tests on the effectiveness of hand-operated vibrating screeds in laying concrete pavements. From these it reached the conclusion that full compaction in a slab 6-in. thick can be obtained if the vibrator is tilted or fitted with some form of leading edge, such as a half-round toe. The vibrator must be moved forward in steps and lifted onto the spread concrete at each step, which is hard work and seldom done consistently. These small screeds are often used on private roads.

"Use of Small Vibrating Screeds for Compacting Concrete." By R. H. H. Kirpharn, Road Research Lab. *Contractors-Record,* April 13.

Concreting a Bridge Deck

In planning and building a bridge 4,386 ft. long over the Raritan river on the Garden State Parkway in New Jersey, particular pains were taken throughout to obtain good riding qualities from planning the steel work to curing the concrete. The paving slab is one-course concrete 7 in. thick, deepened to 8 in. over the stringers; two 36-ft. roadways with no longitudinal joints. The mix was the standard of the New Jersey State Highway Dept. The concrete was obtained in transit-mix form and dumped into forms by concrete buggies. A vibrator screed with a bearing surface 6 in. wide, weighing 700 lb. was used; then the surface was gone over transversely with a 16-ft. longitudinal float 10 in. wide of steel equipped with plow handles, operated from a pair of bridges. (The use of a longitudinal float is considered essential to smooth riding.) This was followed by a 10-ft. wood scraping straightedge. The third finishing step was pulling over the surface a drag 42 in. wide consisting of a double thickness of wet burlap



Courtesy California Highways

● **CROSS-SECTION of an actual roadway slipout showing the exploratory borings and the horizontal and vertical drains as installed on the job.**

CAT* No. 212 clears 16-inch snow

FROM NEVADA, MO., STREETS

E. H. JACKSON, operator, and his No. 212. He says: "The only time it ever stops is when I shut it off."

Last December 29, the City of Nevada, Missouri, found itself buried under a 16-inch snowfall. With over 8000 population, Nevada covers a lot of area and has 30 miles of streets.

Before the snow had stopped, E. H. Jackson, operator of the city's Caterpillar No. 212 Motor Grader, was in the cab. When the picture was taken he and his machine had worked steadily for 30 hours and were prepared to keep going until the job was done.

This No. 212 was purchased in 1950. Before that Nevada had struggled along with a grader of another make. "That old rig wasn't worth a day's wages," in the words of the men who had to use it. Street Commissioner J. O. Hendrix got together with the city officials and they decided to buy a Caterpillar machine. They've been happy about it ever since.

What about your own city's snow clearance problem? Are you ready for next winter? Blizzards won't worry you if you have Caterpillar Motor Graders. They take snow removal in stride, just as they handle your grading and street maintenance the rest of the year. Every grader in the line—the 50-HP No. 212, 75-HP No. 112 or 115-HP No. 12—is completely designed and built by one manufacturer. Easy handling and blade adjustment and good job visibility make these machines popular with operators. And their year-round dependability, low maintenance cost and high resale value save money for the taxpayers.

Talk over next winter's equipment with your Caterpillar Dealer. Every machine he sells is backed by the best in service and genuine parts. See him now.

Caterpillar Tractor Co., Peoria, Illinois, U. S. A.

CATERPILLAR*

*Both Cat and Caterpillar are registered trademarks—®

99% OF ALL CAT MOTOR GRADERS EVER BUILT ARE STILL AT WORK

HERE ARE SIGNS
THAT *Crackle* WITH AUTHORITY!

NEW
40 PAGE CATALOG

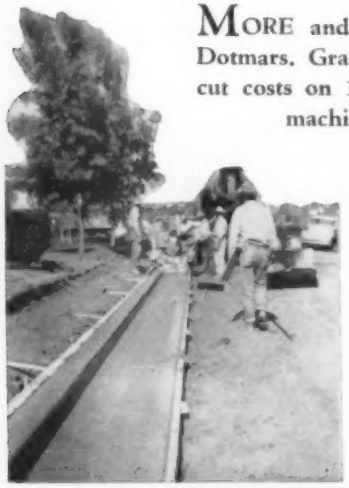
Choose crisp, bright signs that instantly alert the viewer to the prescribed action.

That's a LYLE sign everytime! LYLE signs conform to latest U. S. Standards; they are deeply embossed on durable stock; then carefully finished with high quality baked-on enamel to achieve high visibility.

We've just published a 40-page manual of hundreds of traffic, warning, and street name signs and specifications. Write for your copy.

LYLE SIGNS, INC.
2723 University Avenue, Southeast
Minneapolis 14, Minnesota

DOTMAR CURB, GUTTER and SIDEWALK PAVERS are Cutting Costs Coast to Coast!



MORE and more contractors are cutting costs with Dotmars. Granite Construction Co., Watsonville, Calif., cut costs on 14 miles of integral curb and gutter with machine shown. Pays for itself in first mile of paving. Lays 5 to 10 lineal ft. per minute. Any shape curb or gutter. Greater concrete yield. Simple extension for paving sidewalks. Send for Bulletin 53.

Ask the Man Who Uses One.

DOTMAR AIR ACE HAMMER

Weighs only 3½ lbs. 7" long. Fits hand like a pistol. Power like a cannon. For drilling concrete, chipping, caulking, riveting, sheet metal cutting. Only $49.75. Send for Bulletin 154.

Dotmar INDUSTRIES Inc.
533 HANSELMAN BUILDING KALAMAZOO, MICHIGAN

Need more facts about advertised products? Mail your Readers' Service card now.

without seams; followed by use of a broom 32 in. long having two rows of 5-in. fiber bristles, operated from edge to edge of the pavement.

"Smooth Decks Through Well-Planned Concreting". By Harry A. Hartmann, N. J. Highway Authority. *Engineering News-Record,* April 28.

How Not to Reinforce Asphalt

Last year 4½ miles of the Pennsylvania Turnpike was surfaced with a 3-in. layer of hot-mix bituminous concrete on cement concrete, on which a wire mesh had been laid for reinforcement. Generally in such construction the wire mesh rises ¾ inch or more into the binder course during placing and rolling it; but in this case the reinforcement did not rise but actually formed a separation between the base and the asphalt, permitting the latter to shove and form potholes. The cause is believed to have been the use of aggregate up to 1½ in. in size, whereas the aggregate used on successful jobs had been ¾ in. The large-aggregate binder obtained only 60 percent compaction under the tamping bar of the paver. The sheets of reinforcement were laid overlapping, and cracks appeared in the asphalt at almost every overlap. As a result, the entire 4½ miles of surfacing was removed and replaced with the conventional 3 in. of hot asphalt concrete.

"Failure of Penn Turnpike Resurfacing a Lesson in the Use of Wire in Asphalt," *Engineering News-Record,* May 19.

Effect on Traffic of Objects on Shoulders

Shoulders permit vehicles to stop for repairs, etc. without serious interference with the speed of traffic past them; but shoulder parking generally causes a swerving of the traffic in passing them. How much swerving, and the extent to which this is affected by the position of the stationary vehicle relative to the edge of the pavement, was studied by the Bureau of Public Roads. In making this study, three types of stationary objects were used—a car, a truck or a barricade; and in three locations—at the pavement edge, 3 ft. from the edge, and 6 ft. from the edge; and on both 2-lane highways and 4-lane divided highways.

It was concluded that: 1.—Vehicle speeds are not significantly affected by objects on the shoulder during light to moderate traffic volumes. 2.—Objects parked on one

GO where KERRIGAN Lights the Way . . .

and SEE what MODERN Street Lighting means!

Downtown Houston, Texas. Looking North at new County Court House.

Go to Rochester, Binghampton, Long Island, or Utica, New York . . . Go to New Orleans, West Palm Beach, Miami Beach, or Orlando, Florida. . . . Go to Greer, S. C. or Beatrice, Nebraska; to Houston, Texas or Nashville, Tennessee. . . . Go east, west, north, or south, WHEREVER KERRIGAN STANDARDS ARE USED TO LIGHT THE WAY: There you'll find modern, scientific street and highway lighting that sweeps night shadows out of your path; magically opens up the road in front of you; and turns night driving into a new, safe, and pleasant experience for the cross-country traveler and the home town tax-payer.

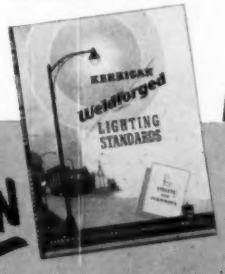
There are definite advantages in specifying KERRIGAN. Our high strength, low-alloy steels make it possible for you to use 11-gauge steel where 7-gauge mild steel has heretofore been obligatory. They PROVE that *strength is more important than weight;* and they offer you improved resistance to corrosion, greater resistance to stress, and a long, useful life wherever KERRIGAN standards are installed.

Let us give you detailed information and PROOF. Write for our new Lighting Standards Catalog containing detailed descriptions and specifications, together with pictures of actual installations throughout the country.

Rochester, N. Y. Downtown scene with Hotel Rochester in the background.

Miami Beach. Standard unharmed even where the fury of the wind uprooted trees during hurricane.

Looking South on Highway 70, Nashville Tenn.



New

For better lighted city streets the standard is Kerrigan!

KERRIGAN IRON WORKS, INC.

NASHVILLE, TENNESSEE

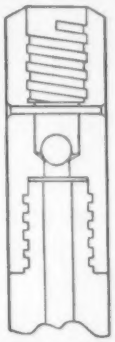
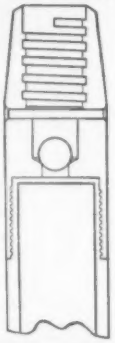
General Sales Office 274 Madison Ave. New York City

Get full details of this month's products . . . mail your Readers' Service card today.

new acker Lynac* split tube sampler

increases service life 100%

HERE'S WHY

LYNAC	ORDINARY
Thick, heavy, rugged barrel and head increase service life by 100%!	Thin, weak barrel and head are easily damaged.
	
Note the thick shoulder of the LYNAC Head.	Compare the thin, easily cracked shoulder of the standard head.

Acker engineers have done it again! By improving the design and construction of the standard split tube samplers, Acker engineers increased the service life of their new LYNAC Sampler by over 100%!

Look over the drawings at the left and you'll see why. Then, write for literature describing Acker's new LYNAC Sampler.

ASK FOR COMPLETE CATALOG ON SOIL SAMPLING

ACKER DRILL CO., Inc.
SCRANTON 3, PA., U.S.A.

*Patent applied for

HAUCK EQUIPMENT

Thawing Burners

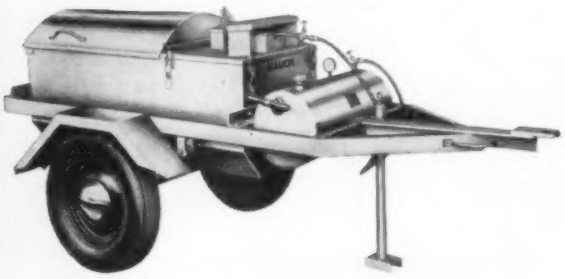
Double Jacketed Rubber and Asphalt Furnace

Compound Melting Furnace

Lead Melting Furnace

Asphalt Tool and Cement Heater

Always Faster • Safer • Easier Melting of Tar • Asphalt



SPEED-MASTER KETTLES

New Advanced Design

Hauck fire box steel firing tube and heavy duty heating tube system. • Improved chassis frame for faster, easier mobility. • Faster melting and draw-off of material. • Comfort, convenience, cleaning and protection features. Sizes—55, 80, 115, 165,230 and 330 gallon capacities. Burn kerosene or bottled gas.

HAUCK MANUFACTURING CO.
117-127 Tenth St., Brooklyn 15, N. Y.

Asphalt and Tar Melting Kettles

Bottom Fired

Speed Master Tube Fired

Write for Catalogs

Thousands use our Readers' Service card to keep up to date . . . do you?

shoulder affected the lateral position of only those vehicles traveling in the lane adjacent to the occupied shoulder. The effect was greatest when the object on the shoulder was at the pavement edge, and diminished rapidly with an increase in the distance of the object from the edge of the pavement.

3. The narrower the pavement, the greater was the shift of traffic to the left or away from the object on the shoulder. On a two-lane highway with a 16-foot surface, the shift was 3.3 feet, and on one with a 24-foot surface the shift was 1.8 feet.

4. A car, truck or barricade on the shoulder had about the same effect on the lateral positions of vehicles on two-lane highways. On the four-lane highway a truck had about the same effect as a car, but a barricade caused a lateral movement about one-half as great as a car or truck.

"Driver Behavior As Affected by Objects on Highway Shoulders". By Asriel Faragin, Engineer, B.P.R. *Public Roads*, June.

Equipment for Roadside Mowing

Wayne County, Mich. uses tractor-drawn fairway units for mowing the urban sections of the superhighways. Most of the single-pavement highways are mowed with tractor side-bar-cutter equipment, which is not controlled by the height of the grass, and not more than two mowings a summer are necessary; in the more rural streets only one mowing, late in the summer. On the banks of the Ford Expressway, two mowers were used last year, specially built with a low center of gravity and dual wheels, excellent for steep-bank mowing. A heavy-duty mower of the whirlwind type was used successfully on steep banks, operated from upper-level service drives by a truck and winch. In rough and inaccessible areas they have used a new rotary-type hammermill mower, which is light and does not kick up stones.

"Tree Trimmings, Tree Removal and Roadside Mowing". PUBLIC WORKS, June.

Protecting Wet Traffic Markings

Some counties and states report little or no trouble with smearing of freshly painted traffic lines by traffic, provided certain precautions are taken, such as warning drivers in advance by means of signs or flagmen. Barricades, rubber cones,

or flags mounted on blocks of wood are usually placed along the wet stripe. Many states give a police escost to striping equipment. Some pass out small handbills asking the cooperation of drivers, and find this surprisingly successful. Others are doubtful of the success of any kind of public education. Reports by 14 officials are quoted in the article.

"How Protect Wet Traffic Markings?" *Better Roads,* May.

Ratings For Rational Road Planning

Kings County, Calif., in a recent study of road and bridge adequacy and improvement priority, employed a rational approach to the engineering and economic evaluation of the road system. This was not considered a substitute for good judgment, but as invaluable to the commissioner and board of supervisors in determining which projects should be included in the annual budget for the next several years. It permits establishing a point rating below which roads are deemed to be critically deficient. This rating study promises to separate fact from fancy; sound judgment from guesswork; decision from indecision; and finality from expediency.

The study was divided into adequacy of geometric design; of physical design; safety, and the service which the road renders to the community. An economic analysis was made embracing three essential phases: costs, revenues, and benefits.

"Ratings for Rational Road System Evaluation and Planning". By H. E. Carlson and G. E. Nichols, Road Commissioners. PUBLIC WORKS, June.

Resealing Joints With Cold Material

During each spring the Ohio highway department renovates joints in concrete pavements as follows: The joint is gouged out with a garden plow carrying a special gouging tooth, and sometimes a wire brush also. Dust is blown out with compressed air. Cold rubber-asphalt joint sealing compound is applied with a hollow applicator from an air pump. Paper strips 3 in. wide are placed immediately to protect the compound. An 8-man gang seals cracks and joints along a mile or more of pavement a day.

"Spring Joint Re-Sealing with Cold Material." *Roads and Streets,* May.

Off-Street Parking In Ohio Communities

Data collected by the Ohio Municipal League show that off-street parking is provided by Marietta, Alliance, Athens and Lorain. In Akron, such facilities are furnished by private parties, and the city is contemplating parking facilities.

In Marietta, the parking lot, opened in 1952, has completely paid for its construction by intake through parking meters. Alliance issued bonds for $124,000, which will be retired from revenue from 108 parking meters. Athens pledged half of the parking meter revenue to finance a loan of $47,000. Lorain financed a $320,000 program by bonds to be retired from parking meter revenue. In Norwood, curb meters average 27 cents per space per day; those on the municipal parking lot average 22 cents. Akron contemplates spending $2,737,000 for off-street parking, estimated to produce gross annual earnings of $356,896, with an operating profit of $181,284, to amortize a 30-yr. 3½ percent revenue bond, the city to pledge an annual $56,972 to be collected from its curb parking meters.

"Off-Street Parking: Ohio's Problem and Remedies". PUBLIC WORKS, June.

NIGHT & DAY

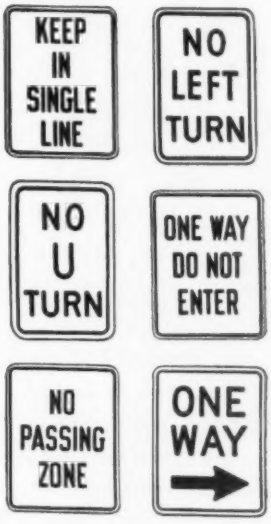
THOUSANDS OF TASSCO SIGNS . . . CLEAN . . . CLEAR . . . EASILY LEGIBLE . . . REGULATE AND GUIDE AMERICA'S MOTOR TRAFFIC TWENTY-FOUR HOURS A DAY, 365 DAYS A YEAR!

Nothing could be more economical than these well-made, extra long life signs . . . *the finest obtainable.*

TASSCO Signs are the result of the most modern manufacturing processes and expert engineering. Whether your need is for standard signs like these or for special signs made to specifications, be sure to consult TASSCO.

ALL ALUMINUM TASSCO SIGNS PROVIDE STRENGTH WITHOUT WEIGHT . . . MAXIMUM RESISTANCE TO WEATHER AND CORROSION . . . MINIMUM MAINTENANCE AND REPLACEMENT . . . AND GREATER LEGIBILITY FOR *MUCH* LONGER! That's *real* economy!

Traffic and Safety officials are invited to write for catalog.



The Sign of TASSCO *Traffic Safety*

TRAFFIC and STREET SIGN COMPANY
84 FOUNDRY STREET • NEWARK 5, N. J.

It's a fact . . . our handy Readers' Service card is the way to get new catalogs.

Chemical Weed Killers in Illinois

Illinois state highway engineers have found that chemical weed killers, such as 2,4-D and 2,4,5-T are of considerable assistance in maintaining a good turf cover on roadsides. Use of soil sterilants can aid in making power mowing more efficient and cheaper.

Chemical Weed Killers Cut Roadside Maintenance Cost". By Richard W. Kress, District Landscape Engr. *Better Roads,* May.

Other Articles

"The **Improvement of Existing Bridges,"** Arch, suspension and truss. By C. S. Chettoe. Contractors Record, April 20.

"**Planting** For Roadsides." By J. R. Evison. Contractors Record, April 20.

"Tests in the Field and Laboratory for **Stabilized Soil** Construction." By K. H. G. Williams. Contractors Record, April 20.

Continental Roads inspected by British engineers. "Oh, For Some Roads as Good as These!" By Percy Parr, Pres., Institution of Municipal Engineers. Municipal Engineering, May 6. Be Learned From the Continent."

"Gravel Glued Together With **Sulphite"** Liquor in Wisconsin. By Francis Brunette, Co., H'way Com'r. Engineering News-Record, May 5.

"Brushwood Control on Roadside Verges" by spraying in England. Roads and Road Construction, April.

"Prestressed Concrete Roads" in England. By J. P. Stott, Road Research Laboratory. Roads and Road Construction, April.

"British Engineers Critical of **Continental Motor Roads"** in Germany, Holland and Belgium. The Surveyor, April 30.

"Speeding Up **Traffic Line Marking"** Jacksonville, Fla. By C. E. Wright. Public Works, June.

"Functional Design for County Highway **Maintenance Building"** designed by an architect. By K. R. MacDonald. Public Works, June.

"A County Highway **Weed Control** Program" in Sussex Co., N. J. Lester N. Price, Board of Freeholders. Public Works, June.

"Advance Borings for Soils Data;" practice in Tennessee. By Edward Burchett, Eng'r of Materials. Roads and Streets, May.

"Minnesota Bituminous Program Reviewed;" 400 miles of plant mixed projects. Roads and Streets, May.

"How (Fresno, Calif.) County **Salvages Old Road** Surfaces," tearing up the old surface and reducing the chunks to specification size. Roads and Streets, May.

"The Case for **Motorways:** Lessons to Contractors Record, May 4.

"Highways for a **Logging and Farming** County," Siskiyou Co., Calif. By Orel E. Lewis, Co. R'd Com'r. Better Roads. May.

"New **Headquarters** for State Road District" at Seattle, Wash. Better Roads, May.

"Expressways for an Urban County" History of the development of a system in Cook County, Ill., estimated to save drivers $60,000,000 annually. Better Roads, May.

"State Sponsors **Soils School** for County Road Engineers," in Kansas. By Walter Johnson, Eng'r, State Highway Com'n. Better Roads, May.

"Blasting in Road Construction, With Special Reference to Millisecond Delay Techniques." Roads and Streets, May.

• • •

Submersible Sump Pumps Solve Difficult Problem

The selection of a pumping system for moving sewage over an eight-foot rise from a septic tank to a tile field 160 feet away was a problem faced by Michigan's Department of Conservation in laying out their new Kent Lake sewage disposal system in the Island Lake Recreation Area at Brighton, Michigan. To solve this problem, the engineering section of the Department of Conservation selected two multi-purpose submersible sump pumps. The pumps were chosen because they were fully automatic and could be placed in the bottom of the wet well, completely out of sight. The pump, motor and switches operate under sewage and are absolutely water-tight. A liquid level switch actuates the pumps without the necessity of floats, switch plungers and electrodes. Sewage rising in the wet well traps air in the skirt of the switch, creating an air head. When sewage rises to a predetermined height the air flexes a diaphragm in the switch, closing the switch contacts and starting the motor. Pump pressure maintains switch contact and automatically stops the unit when the effluent reaches a level of ⅝ in. from the bottom of the wet well. Thus, it is possible by proper location of the switch to pump any desired amount of effluent to flood the disposal field in accordance with state health directions.

The pumps and switches were furnished by Kenco, Inc., Lorain, O. The pumps were Model 109, multi-purpose submersible; the switch was a "No-Float" liquid level unit, also made by Kenco.

4-wheel drive does another job better!

BACKFILLING

Equipped with a hydraulically-controlled front-mounted dozer blade, the 4-wheel-drive Universal 'Jeep' is an efficient backfiller. Shown here is a blade mounted on a 'Jeep' trencher—thus creating a single power unit that does both trenching and backfilling. See your nearest Willys dealer or write for information.

4-WHEEL-DRIVE
UNIVERSAL
'Jeep'®

A member of the 'Jeep' family...world's largest-selling 4-wheel-drive vehicles

Willys Motors, Inc., Toledo 1, Ohio

Now's the time to mail this month's Readers' Service card.

Using Compressed Air Tools on Public Works

(*Continued from page* 101)

hammers can be used for all chipping operations, including work on steel. They will also cut rivets and do caulking and beading, including lead caulking of cast iron pipe joints. Cement hammers will also vibrate dried cement from forms and mixers.

Air impact wrenches, which are quickly reversible, speed up the removal of rusted-on bolts and nuts, driving or removing nuts or bolts in a fraction of time required by hand wrenches. Air impact wrenches are valuable for replacing treads on track-type tractors and for changing tires on trucks, tractors or other rubber tired equipment.

Drilling and Boring

Wagon drills are used for drilling deep holes for blasting out rock, and also are used for road grading in rocky areas. The rock drill, which is a hand-held tool, can also be used for these operations; and for drilling holes in large rocks or boulders for powder shots to break them for easier handling. The rock drill also is used for drilling holes for mud jacking and can also be used as a paving breaker by removing the rotating mechanism, therefore serving a double purpose.

Earth boring, wet or dry, with air drills is one of the newest developments in compressed air operated tools. It is now being used extensively for putting pipes and conduits under ground without making open cuts. This saves replacing the surface and also avoids disrupting traffic. Drilling horizontal holes by which pipes can be installed underground results in tremendous savings that may more than pay for the cost of the earth boring outfit on a single operation. In normal earth or clay soil, the dry earth borer is used. This has a cutting head with a feed screw to pull it into the ground when rotated with an air motor. The cutting head is designed with an adjustable cutter that cannot thread itself in the earth and the cutting tool is adjusted to remove only the amount of earth that the feed screw can normally feed. Horizontal holes are drilled up to 100 feet, as large as 20-inch diameter. This type of dry boring tool can also drill vertical holes such as post holes or shallow wells to approximately 40 feet depth or even more. One tool will drill an average fence post hole in a minute, and the average light pole hole in three minutes.

Wet type earth boring tools are used in dry, hard soils with a fish tail bit used directly on the pipe being installed. Water is fed to the bit through the pipe and spindle of the air drill, washing the drillings back and out of the hole. Wet drilling is big business in cities that have dry, hard soil, but this method can be used in all other soils as well, and in some localities is preferred to dry drilling on smaller pipe installations. Wet drilling does not as yet have the diameter hole capacity of the dry type earth boring as outlined above.

Another method of putting pipe under ground, which is limited to approximately ¾ to 1½-inch size, is by threading a feed screw directly on the end of the pipe being installed. By rotating the pipe with an air drill the feed screw will pull the pipe through the ground. This method is preferred to boring holes for the smaller size pipe.

Air grinders are on the team of air tools in city work and serve in the capacities of straight and vertical grinders, sanders, and wire brush machines. They will sharpen tools on the job, grind and sand or wire brush wherever compressed air is available. Air grinders develop as much as 3 to 4 horsepower in weights of approximately twelve pounds, can be operated by one man, and will perform jobs that would be impossible to do by any hand method.

Air saws are available in the circular saw blade type up to 12-inch blades that will cut timbers to a depth of 4⅜ inches. These can be operated by one man, and will saw timbers many times faster than any two man push-pull saw blade. Air operated chain saws are also available for cutting down trees and for sawing the tree into sections that can be handled for disposal. Chain saws work so much faster than hand labor that no city can afford to be without such equipment. Air operated saws are normally light in weight, making them flexible and easy to use. They will operate in any position.

There are many other compressed air operated jobs in city work, such as: paint spraying; cutting cast iron pipe; tapping water mains; sand blasting; cement gun work; spraying insecticides; car and truck lifts for servicing; door opener and closer; and air vises for holding.

4-wheel drive does another job better!

TRANSPORTING WORKERS

Wherever the job may be, the 'Jeep' Truck gets there with men and equipment. With the extra traction of its 4-wheel drive, it goes through sand, mud, snow and roadless fields . . . up steep hills and other places ordinary vehicles can't go. On good roads it shifts easily to 2-wheel drive for conventional driving. See your nearest Willys dealer or write for information.

4-WHEEL DRIVE 'Jeep'® TRUCK

WILLYS...world's largest makers of 4-wheel drive vehicles

WILLYS MOTORS, INC., TOLEDO 1, OHIO

Need more facts about advertised products? Mail your Readers' Service card now.

PUBLIC WORKS DIGESTS

The WATER WORKS Digest

Microstraining of London's Water Supply

The Metropolitan Water Board of London, England is completing a new purification works with a capacity of 90 mgd. Purification consists of aeration, microstraining, filtration and chlorination; with provision for adding activated carbon filters if necessary. Aeration will be secured by discharging the water into a basin over the top of a vertical inlet pipe, from which it cascades. Microstrainers are used because of easy maintenance, continuous mechanical cleaning, and economy of space. The screened water passes to slow sand filter beds 8 ft. deep.

"Water Purification Works at Ashford Common." By G. H. Mugurian. *The Surveyor,* May 7.

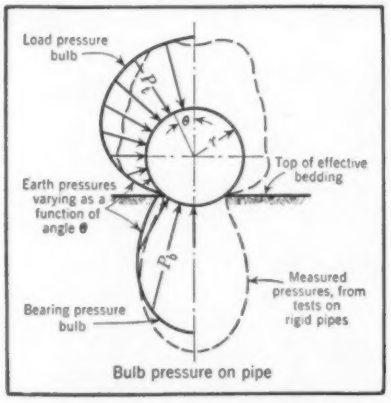
Bedding and Backfilling Large Pipe

In building 72 miles of the second barrel of the San Diego, Cal., aqueduct in 1954, concrete pipe 75 to 48-in. diameter was used. A considerable part of the cost was for reinforcement used to resist the outside earth pressures, and a careful study was made of what these pressures would be under various conditions so as to permit reducing the amount of reinforcing to the minimum that would be safe. Non-cylinder type was used for hydrostatic heads up to 100 ft. and cylinder type for heads above 100 ft. and up to 650 ft.; above that, steel pipe was used. The Bureau of Reclamation adopted bulb-like earth pressures as the most logical design assumption. In the illustration, the dotted line shows pressures measured in the tests on rigid pipe; the solid line, the pressures assumed in the design. Pressures are assumed to act radially on the pipe and to vary with the central angle. The sum of the vertical components of these pressures equals the total vertical earth load. The bending moments of the earth load vary with the width of the bearing under the pipe, and consequently the amount of reinforcement necessary decreases as the width of the bedding increases. In this case, bedding material had to be imported and bedding over a central angle of 90° was calculated to be the most economical. Two methods of bedding were employed. In making "consolidated backfill" bedding, free-draining material is used, fitted and vibrated; this is satisfactory on grades up to 30 percent. On steeper grades, or where free-draining material is not available, "compacted" backfill is used, silty or clayey material being compacted by mechanical tamping. The consolidated method is preferred.

"Bedding and Backfilling Methods Save Reinforcing in San Diego Aqueduct". By Robert E. Sailer, U. S. Bureau of Reclamation. *Civil Engineering,* May.

Improved Method Of Odor Control

Hammond, Ind. in January 1950 suffered severe taste and odor in its water supply, the threshold odor reaching 200, and the carbon dosing machine feeding 550 lb. per hr. could not reduce the odor sufficiently. The raw water is sampled for odor every 2 hr. when the odor is under 25, and every hour when it is over that. The odor was phenolic, intensified by chlorine, which was applied prior to the carbon application. This method was changed to one in which samples for odor and chlorine residual were taken at the outlet end of the mixing basin, after 30 min. contact, as well as at the inlet end, as formerly; also samples of filtered water and tap water are taken every one or two hours. This gives earlier notice of unsatisfactory odor removal and necessity of increasing or possibility of decreasing the carbon dosage. Also application of chlorine is changed from the upper end to the lower end of the mixing basin. Since changing the procedure the amount of carbon used per year has been reduced 50 percent, and for two years there has not been a single complaint about taste or odor.


Load pressure bulb
Top of effective bedding
Earth pressures varying as a function of angle θ
Measured pressures, from tests on rigid pipes
Bearing pressure bulb
Bulb pressure on pipe

Courtesy Civil Engineering

● BULB-LIKE pattern of earth pressures has been adopted by Bureau of Reclamation as most logical design assumption for earth loads on pipe.

"Better Taste and Odor Control Results in Chemical Savings". By A. G. Giannini, Supt. PUBLIC WORKS, June.

Water Rates In North Carolina

The author finds important differences between municipally and privately owned works in the legal and financial arrangements. His paper deals principally with the former, using as illustration analyses made for Raleigh, Greensboro and Winston-Salem, N. C. He summarizes his conclusions as follows: 1. The water rates to be paid by the average domestic consumer should be 2-2½ times as high as the rate paid by the average large manufacturer. Low industrial rates of less than one-third the domestic rates cannot be justified in these cities. 2. Outside-city consumers should pay from about 50 to 100 percent more than inside-city consumers for water service. A rigorous analysis shows the outside-city consumers' costs to be somewhat lower than these limits, but intangible factors

Little Things Mean A Lot

in Rockwell Disc Meters

Tropic Type
All-bronze, split case construction

Arctic Type
A bronze meter with breakable frost bottom

Little Things Like Stainless Steel Trim For The Best Corrosion Protection

Many potable waters are corrosive to meters—some more so than others. Rockwell guards its Arctic and Tropic meters against corrosive attack through the use of carefully selected and treated stainless steel at such vulnerable points as the division plate, driving dog, disc spindle, stuffing box spindle and screws.

If corrosion is a problem with you, contact your nearby Rockwell office for the best advice and protection you can get.

The Symbol for Service, Quality ROCKWELL *and Performance in Water Meters*

ROCKWELL MANUFACTURING COMPANY

PITTSBURGH 8, PA. Atlanta Boston Charlotte Chicago Dallas Houston
Los Angeles Midland, Texas N. Kansas City, Mo. New York Philadelphia Pittsburgh
San Francisco Seattle Shreveport Tulsa

Thousands use our Readers' Service card to keep up to date . . . do you?

which cannot be accounted for entirely in the analysis justify some extra charge.

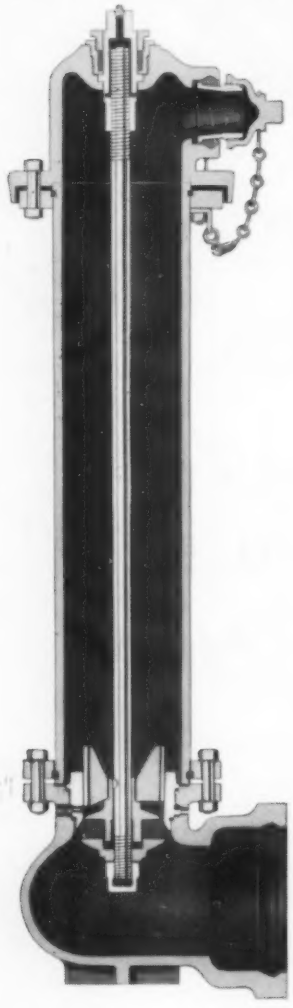
"Development of Adequate Water Rate Structures in North Carolina". By Richard Hazen. *Journal, AWW Assn.*, April.

Worms in a City Water Supply

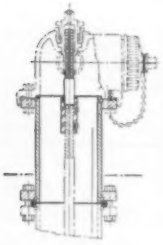
Norwich, England, obtains its water supply from a sluggish river which drains about 256 sq. mi., mostly agricultural land. This is treated partly by slow sand filtration and partly by rapid sand. In June 1953 *Nais* worms were found in water flushed from fire hydrants. Very few were found in water from consumers' taps. It was found that these worms were passing through the slow sand filters in large numbers, but none through the rapid sand filters. They were readily killed by 1 ppm chlorine, and chlorine dosage giving 2 ppm in the mains, followed by flushing, cleared them from the distribution system, but the presence of the dead worms in the water was objectionable. To prevent a recurrence of the infestation, two alternatives were considered. Replacing the slow sand filters with rapid sand would be very expensive. It was found that microstrainers would remove the worms, and it was decided to install two of them 10 ft. in diameter, through which all water will be passed before chlorination.

"Infestation of the Norwich, England, Water System." By S. N. Kelly, Engr. & Mgr. *Journal AWW Assn.*, April.

COSTS LESS TO INSTALL COSTS LITTLE TO MAINTAIN



A community can rest easy when it is protected by R. D. Wood Swivel-Joint Hydrants. Trouble can be a long time coming, but when it comes these great hydrants are ready. Installation and maintenance costs are low. They work instantly, reliably. Water-carrying areas are generously sized for full flow and maximum pressure. Every point of friction is protected by at least one bronze surface. Accurately formed threads and fitted parts make them interchangeable with other hydrants of the same size. Compression-type valve stops leakage when hydrant is broken in traffic accident.



Extension piece can be inserted between hydrant head and barrel, or between barrel and elbow, without shutting off water supply.

Breakable flange and stem coupling can be furnished at extra cost. Both are constructed so that a heavy blow will snap the ring and coupling, thus saving more costly damage to the hydrant itself. Both can be replaced quickly and inexpensively with spares. No digging necessary.

R.D. Wood Swivel Joint Hydrants

Public Ledger Building, Philadelphia 5, Pa.

Manufacturers of "Sand-Spun" Pipe (centrifugally cast in sand molds) and R.D. Wood Gate Valves

Send for this 80-page catalog. It contains full information about the R. D. Wood line of Cast Iron Pipe, Fire Hydrants, Gate Valves, and Hydraulic Machinery.

It's a fact . . . our handy Readers' Service card is the way to get new catalogs.

Corrosion and Scale Formation in Domestic Heaters

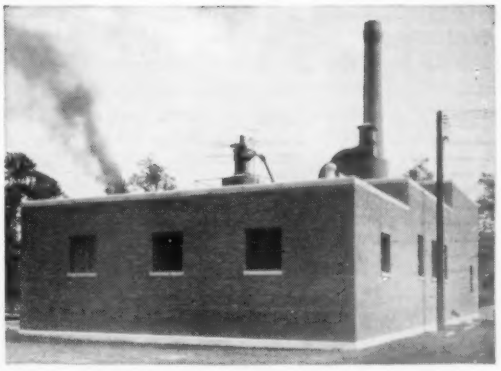
About 140°F is a critical water temperature in domestic water heaters; above this point physical and chemical reactions become very rapid. It is not necessary to go beyond this to obtain sufficient hot water if adequate storage is provided. Corrosion can be controlled through the use of proper materials and good structural design. The author believes that the control of domestic water heater installations should be in the hands of the water works industry. The consumer then would be sure of the best possible hot water service.

"Chemical and Physical Reactions in Water Heaters". By J. Robert Popalisky, Supt. of Water Purification, Kansas City, Mo. *Journal AWW Assn.*, April.

Sea Water For Regenerating Zeolite Softeners

Instead of regenerating their zeolite softeners with pure salt, a few cities are using sea water which contains 3.5 percent total salts, of which 2.7 percent is sodium chloride and 0.8 percent is impurities, mostly magnesium and calcium salts. One municipal plant softens water with 60 to 70 gpg hardness at a cost for sea water of $9.00 a day, while salt would cost $155.00 per million gallons. But from 1-2/3 up to 2½ times as much zeolite must be used, and larger softener units must be provided to hold more zeolite. Hollywood, Fla. has been using sea water in its softeners for 16 years; it now has softening capacity of 8,500,000 gpd. The net saving here by using sea water is calculated to be $107.50 a day. Not only sea water can be used for regenerating, but also connate waters and natural brines varying in salinity from ½ up to 5½ times that of sea water.

"It's Cheaper by the Gallon". By Eskel Nordell, Permutit Co. PUBLIC WORKS, June.



City of SHEBOYGAN, WISCONSIN
SEWAGE TREATMENT PLANT
2333 LAKE SHORE DRIVE
"The City of Elms"

January 15, 1955

Mr. C.W.Gordon, Manager
Raymond Division
Combustion Engineering Inc.
1315 North Branch St.
Chicago 22, Ill.

Dear Sir:

In reply to your letter of January 14, 1955, regarding the operation of our Flash Dryer System, please be advised as follows;

Our Flash Dryer System was placed in operation in November 1946, and since that time, we have dried all our sewage sludge with this process.

The total expenditures for repair parts during this period, does not exceed $300.00.

We have during this time, disposed of all of the dried product as a fertilizer.

We are well satisfied with the operation of this phase of sewage treatment, and are pleased to show visitors our installation at all times.

Yours very truly,

Jake A. Klein Supt.

Just mention our name in Sheboygan

Mention it at any rate to Jake Klein, Superintendent of the Sewage Treatment Plant, and he will be glad to show you around. He knows us and knows our equipment. In fact, for almost ten years the Sheboygan plant has been flash drying its digested sewage sludge with C-E Raymond Flash Drying equipment—and *selling its entire output.* During the past year total sales were 905 tons.

Naturally, we're pleased as Punch with Jake's letter reprinted here—but hasten to add we've received many others.

So, if you're thinking of a new disposal plant, investigate the C-E Raymond Flash Drying System. It can incinerate—or dry—or both—alternately or concurrently. We believe we have the best system of sewage sludge disposal. We would like the opportunity to tell you why.

B-834

COMBUSTION ENGINEERING
RAYMOND DIVISION
1315 North Branch Street, Chicago 22, Illinois

Eastern Office: 200 Madison Avenue, New York 16, New York • Western Office: 510 West Sixth Street, Los Angeles 14, California

ALSO FLASH DRYING AND INCINERATION SYSTEMS FOR INDUSTRIAL WASTE DISPOSAL

Now's the time to mail this month's Readers' Service card.

Fluoridation Chemicals For Water Treatment

The ideal fluoridation compound would be a non-hygroscopic, free-flowing, non-dusting and colorless, crystalline powder of uniform powder size suitable for dry or solubilized liquid feed introduction. It should be a fluoride salt of minerals normally present in potable waters; readily available and of low cost. No one compound has all these advantages. Past experience has been largely with sodium fluoride which is readily available and easy to use. Calcium and magnesium fluorides precipitate in hard water. Sodium silicofluoride is readily available; it is chemically different from sodium fluoride, but it reacts with alkalinity normally present in water to form sodium fluoride, as do hydrofluosilicic acid, hydrofluoric acid and all other acid-reacting fluoride salts. A growing demand for fluoride chemicals for industrial purposes has threatened a shortage of sodium fluoride, but silicofluorides can be obtained as a by-product in processing phosphate rock for fertilizers, and it is possible to obtain 50,000 to 75,000 tons a year of silicofluorides from this source. As a general rule, plants up to 2 mgd will use the more soluble compounds for accurate solution feeding. Larger plants can use effectively the less soluble ones through dry feeders.

"Fluoridation Chemicals Used for Water Treatment". By B. W. Graham, Davison Chemical Co. *Water Works Engineering,* May.

Increased Sizes of Services and Meters

The common complaint by consumers of poor pressure is often unwarranted; even when pressure in the mains is ample, the service and meter may be too small. The water department of Los Angeles, Calif., has adopted a procedure and equipment for measuring the loss of head in the plumbing of private residences, for their own information and that of the consumer. It is found that sizes adequate years ago cause an excessive loss of pressure when called upon to supply washing machines, dish washers, flushometer valves and other modern equipment. As a result of such tests, Los Angeles water department is recommending 1-in. service connections as a minimum size for all new customers.

"Consumer Service Requirements". By Emil S. Mamrelli, Design Engineer of Water Dept. *Journal AWW Assn.*, April.

Plastic Sealers at Reservoir Construction Joints

In building a concrete reservoir 180 x 300 ft. with vertical walls, San Bernardino, Calif. has used as a sealer at construction joints, instead of the previously used sheet copper, a polyvinyl plastic sheet providing a labyrinth of passageways which has proved to be watertight and easier to install without injuring it than is copper. The material is easily fused together by a hot knife or blow torch.

"San Bernardino Uses Plastic Sealer in Construction of New Reservoir." By L. A. Hosegood, Supt. *Western City,* April.

Handling Activated Carbon as a Slurry

Chicago's South District Filtration Plant receives activated carbon in bulk in hopper-dump railroad cars, which unload it into receiving tanks below the track, where it was at first mixed with water by slow-speed, long paddle mixers and compressed air. This required 2 to 7 days, and the steel tanks corroded rapidly; additional tanks of rein-

WHIP

EXPANSION
CONTRACTION
SETTLEMENT
WITH

McWANE-PACIFIC SUPER DELAVAUD
MECHANICAL JOINT CAST IRON PIPE

Practical water or gas distribution men well know that pipe line settlement, expansion and contraction from season to season sometimes cause joint leaks in bell-and-spigot pipe lines.

This kind of trouble may be prevented in future pipe line construction by the use of McWane-Pacific Boltite mechanical joint cast iron pipe. Boltite mechanical joints stay flexible; permit settlement, expansion or contraction without leakage. The special bolts, glands, and sealed-in rubber compound gasket last as long as the pipe.

For details, wire or write McWANE CAST IRON PIPE COMPANY, Birmingham, Alabama, or PACIFIC STATES CAST IRON PIPE COMPANY, Provo, Utah. (Sales offices in principal cities.)

McWANE PACIFIC PIPE *Lasts for Centuries*

Need more facts about advertised products? Mail your Readers' Service card now.

forced concrete were constructed; and high-speed mixers requiring 20 and 25 hp. motors were installed. The carbon now is mixed with the water as it falls from the car and can be pumped at once to the feeding tanks or may be stored in the receiving tank. There is saving in the cost of carbon by this method.

"Activated Carbon Slurry Handling at the South District Filtration Plant." By John R. Baylis, Engr. of Water Purification, *Pure Water,* April.

Prestressing a Precast Water Tank

The Southern California Water Co. has just completed two 1.4 mg storage tanks 111 ft. in diameter and 19 ft. high. The walls, 6 in. thick, were precast in 20 separate sections, which were prestressed before being placed in position. When in position, the joints between panels were gunited. Horizontal prestressing of the completed tanks was effected by the "Preload" method of wire wrapping, with 10 wires per foot at the top and 42 at the bottom. The tank walls rest on a graphite-impregnated pad on a steel-trowelled surface, a rubber ring working against steel insets provides water-tightness.

"Prestressing a Precast Water Tank." *Engineering News-Record,* May 19.

Adequacy of Public Water Supplies

Business and Defense Services Administration has recently analyzed its "Inventory and Adequacy of Major Community Water Supplies," assembled last fall. This shows that 42 percent of the 552 major water supply systems of the country were inadequate in one way or another. It is estimated that expenditures of over three billion dollars would be needed just to bring these systems up to date. An adequate supply is defined as 20 percent above the maximum day's use; if the capacity is only 5 percent above, the supply is considered hazardous. The average per capita consumption is estimated to be 152 gpd.

"Only 58 Percent of U. S. Water Supplies Considered Adequate." *Water Works Engineering,* May.

Use of Millipore Filters

A Millipore filter is a "non-fibrous cellulose ester sheet material of approximately 150 microns

ALGAE OF IMPORTANCE IN WATER SUPPLY

by C. Mervin Palmer, Aquatic Biologist, and Clarence M. Tarzwell, Scientist Director, Robert A. Taft Sanitary Engineering Center Public Health Service, Cincinnati, Ohio

6 Full Pages of 4-Color Illustrations By Harold J. Walter

This major article appeared in June issue of PUBLIC WORKS, prepared in close collaboration with U. S. Public Health service authorities, includes for the first time in magazine history, full and accurate color plates for the identification of types of algae most important in water supplies—those which cause tastes and odors, clog filters or are likely to be found in clean or polluted waters. Color plates of this quality have never before been available to simplify the job of algae identification.

REPRINTS ARE AVAILABLE!

In the reprints the color plates are printed on one side of a page only, and are thus suitable for framing or mounting. The binding will permit the color plates to lie flat. Order yours immediately, at the following prices:

Single copies	$2.00	Twenty copies	$25.00
Three copies	5.00	Fifty copies	50.00
Ten copies	15.00	Over Fifty, each	1.00

USE THE COUPON!

Address:

Leadership

PUBLIC WORKS

Publications

310 East 45th St., New York 17, N.Y.

Book Department, Public Works
310 E. 45th St., New York 17

For the enclosed $..... please send me ..... copies of reprints of "Algae of Importance in Water Supply."

Name .....

Title .....

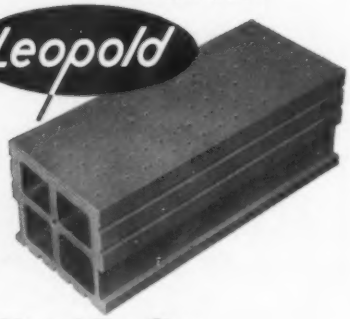
Address .....

Get full details of this month's products . . . mail your Readers' Service card today.

PROVED PERFORMANCE

in over 300 plants with a daily capacity of 1¾ billion gallons...

Leopold



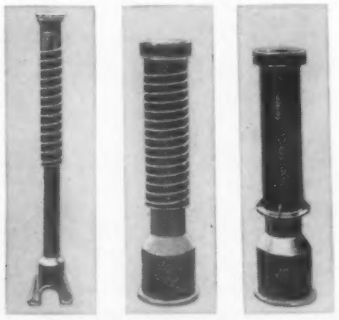
Glazed Fire Clay
TILE FILTER BOTTOMS

Leopold Duplex Filter Bottoms are getting more popular every day. And for good reasons, too. They last longer, perform better, and are unequalled in economy. Want more details on this "performance-proved" filter bottom? Write us today. No obligation.

F. B. LEOPOLD CO., INC.
2413 W. Carson Street, Pittsburgh 4, Pa.

BUFFALO MUNICIPAL CASTINGS

are Heavier, more Rugged! Which means years of extra service!



Durability and strength are embodied in every "Buffalo" casting and that means years of extra service that is trouble-free. Each step in the production of a Buffalo Pipe casting is carefully engineered, supervised and controlled — thus producing strong, quality castings to any physical or metallurgical specifications.

For quotations, write to Dept. H

BUFFALO PIPE & FOUNDRY CORP.
BOX 55—STATION B DE 6764 BUFFALO, N.Y.

thickness . . . more than 80 percent voids", containing billions of tiny openings uniformly spaced. They are used in water laboratories for the detection and identification of pathogenic organisms in as little as 15 or 16 hrs., with an accuracy equivalent to four 5-tube MPN's. They make possible the isolation of specific pathogens with a relative ease not formerly possible; and with a sharp reduction in the technician hours required to establish adequate water controls, while at the same time assuring greater reliability of results. The filter and procedures for using it are described in this article.

"A Remarkable Development in the Control of Water Quality". By Walter W. Kenyon, Millipore Filter Corp. PUBLIC WORKS, June.

Other Articles

"Modern **Water Rates**" in eight cities. American City, May.

"Determination of **Radioactive Strontium** and Barium in Water," with a precision of about 10%. By Richard B. Hahn, Assoc. Prof. of Chem., Wayne Univ.; and Conrad P. Straub, Robert A. Taft San. Eng. Center. Journal, AWW Ass'n, April.

"**Fresh Water From Sea Water** for 8.4¢ per Thousand Gallons." By William R. Copeland, M.I.T. Water Works Engineering, May.

"Organism Resembling **P. tularensis Isolated** from Water." By Carl L. Larson, William Wicht and William L. Jellison. Public Works, June.

"**Water and Sewer Services** in Colorado;" financing, costs and rates. Public Works, June.

"**Water Supply Cooperation**" of two Kansas cities and three refineries to obtain a supply for their joint use. By Stanley H. Dial, Asst. City Mgr., and Bernard T. Budd, Asst. City Engr., Eldorado, Kans. American City, May.

"**Algae** of Importance in Water Supplies." A general description of them, their characteristics and effects on water and water treatment. (With illustrations in color). By C. Mervin Palmer, aquatic biologist, and Clarence W. Tarzwell, Sci. Dir., Robert A. Taft San. Eng. Center. Public Works, June.

"Prestressed-Concrete **Pipe Bridge** at Nottingham." A bowstring truss carries two 21-in. water mains across the Trent River, England, with a 250-ft. span, 20 ft. above the water. The Surveyor, April 23.

"Utilisation des **Matieres Plastiques** Dans les Distributions d'Eau." Pipes of polyvinyl, polythene etc. By Robert Guillot. La Technique de l'Eau. April 15.

"**Instrumentation and Control.**" The 21st of a series. By George E. Symons. Water & Sewage Works, May.

"**Increasing the Capacity** of Existing Treatment Plant Facilities." Various methods described. By R. S. Rankin, Dorr-Oliver Co. Journal, AWW Ass'n, April.

"**Bogota, Colombia** Water Supply" now under construction. By H. W. Bosemberg, Universal Trade Press Syndicate. Water Works Engineering, May.

"Extensive Planning for **Well Supply** Pays Off" at La Crosse, Wis. Experience with test wells. By Zenno A. Gorder, City Engr. Water Works Engineering, May.

"**Rubber Lining** Stops Leakage in Concrete Service Reservoir" in Sunderland, England. Water Works Engineering, May.

"**Water Main Cleaning** and Lining." Technique and advantages. By J. A. Frank, V. P., Nat'l Water Main Cleaning Co., and A. G. Perkins, Centriline Corp. Water & Sewage Works, April.

"**Limiting Entering Head,**" a new term used for application to net positive suction head. By R. A. Miller, Allis-Chalmers Mfg. Co. Water & Sewage Works, April.

"**City Planning** and Water Works." By George C. Ahrens, Supt. of WW, Ottumwa, Iowa. Journal, AWW Ass'n, April.

"**Maintenance of Filter Instruments;**" seven years' experience in Chicago's South District Filtration plant. By Timothy D. Nulty, Chem. Engr. of that plant. Water & Sewage Works, May.

The California Water Plan. Three papers presented before the California Section of the AWW Ass'n: "Development of the California Water Plant," by C. A. Griffith, State Water Resources Board; "Some Legal Aspects of Ground Water and the California Water Plan." By Henry Holsinger, Att'y, State Dept. of Pub. Wks.; and "California Ground Water Replenishment Bill," by R. W. Chase, Att'y. Journal, AWW Ass'n, April.

"Problems of **Ground Subsidence.**" It is more common than is generally realized. By R. R. Shoemaker and T. J. Thorley, Harbor Engineers, Long Beach, Calif. Journal, AWW Ass'n, April.

"Chlorination Can Reduce **Pipe Line Friction,**" using intermittent treatment. By John A. Fulkman. Water & Sewage Works, April.

"**Diatomite Filtration** As It Is Known Today." By Conrad E. Lawlor, General Filter Co. Water & Sewage Works, April.

• • •

Cost of Repairing Leaks in Water Mains

For repairing leaks in Toledo's water mains in 1953, of which there were 289 reported, the average cost was $34.55. Of this, about 43.5 percent was for material and equipment and 56.5 percent for labor.

Controlling Flies and Washing Garbage Cans

Garbage cans are washed every ten days in Hutchinson, Kans., with a truck-mounted machine that follows the collection crew. The city owns its own garbage cans and has found that keeping them clean discourages fly production. The fly control program includes enforcement of a rule that garbage must be wrapped in paper. Regular washing also keeps offensive odors to a minimum. Cost of fuel for operating the washer is about $4 a day, the labor of three men is about $40, and detergent $1.25 per day. The washing machine includes a 350-gallon water tank with immersion burners that keep the temperature of the water at 180 degrees.

California's Water Supply Critical

State Engineer A. D. Edmonston, in a recent report, says that in areas that rely on ground water basins, the water supply condition will become acute if the drought conditions now existing, the worst since 1947, should continue through another season. Many conservation reservoirs had on April 1st only about 44 percent of their capacity, about 5,800,000 acre-feet less than a year ago.

• • •

Chapter Activities

(*Continued from page* 104)

Frank S. Foster, Jr. of the Portland Cement Association was guest speaker at the last monthly meeting of the **New Orleans Metropolitan Chapter.** His talk dealt with the activities and services of that Association. The meeting was held in the Auditorium of the International House.

David Mann, Director of Public Works of Niagara Falls, N. Y., was elected President of the **Up-State New York Chapter** at its annual spring meeting in Troy. John V. Lewis, Director of Maintenance and Operation of the Rochester Department of Public Works was named Vice President, while Ernest A. Steuding, Superintendent of the Board of Public Works of Kingston was elected to serve as the new Secretary-Treasurer of the Chapter.

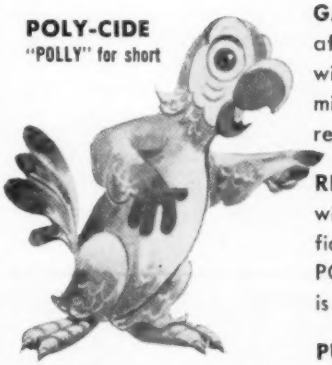
The annual meeting of the **Alabama Chapter** of the APWA was recently held in Gadsden. One of the highlights of the meeting was a talk entitled "Trends In Tax Structures As They Affect Local Governments", By Albert Rains, U. S. Congressman from Alabama. Leonard Bear, President of the Alabama Leagues of Municipalities also was a guest speaker at the meeting. New President of the Chapter is Oliver Wright, Superintendent of Streets for Montgomery. Other officers are Mayor Felix Erwin of Tarrant City, Vice-President; J. O. Dunn of Birmingham was re-elected Secretary-Treasurer. Mayor J. T. McLaughlin of Fairfield and Neal McRae, Assistant Superintendent of Streets for Birmingham were named to the Board of Directors. Sam Lasseter, Jr., Commissioner of Public Works of Gadsden and Immediate Past President of the Chapter is an ex-officio member of the board.

Morton Hilbert, Director of the Division of Engineering of the Wayne County Department of Health gave a very interesting talk at a recent meeting of the **Michigan Chapter.** His talk concerned his assignment to Indo-China under the auspices of the Foreign Operations Administration. The water supply and excreta disposal problems, and the site selection for 200 new villages, which were being developed for 500,000 refugees constituted the major activity of Mr. Hilbert's assignment. Louis H. Moehr, City Engineer of the host city of Wyandotte arranged a fine display of public works equipment and tour of major projects.

Seventy members and guests attended the May meeting of the **Northern California Chapter** in Oakland. The meeting featured a talk on the State's 1911 Improvements Act by Eugene K. Sturgis, a local attorney who is a recognized authority on the Act. Another meeting was held in San Jose on June 9th. "Helicopters In Peace and War" was the topic of an interesting after-dinner talk by Captain William M. Knowlton, 41st Air Reserve Squadron, of Hamilton Field, California.

Over 150 public works officials and equipment suppliers attended the Annual Spring Meeting and Equipment Show of the **Chicago Metropolitan Chapter,** May 25, 1955. The meeting was held at Chevy Chase Country Club, at Wheeling, Illinois. Jack Ryan, famous sports writer for the *Chicago Daily News* was the guest speaker at the dinner meeting. C. L. Baylor, Village Engineer of Downers Grove was re-elected President of the Chapter. All other officers were also re-elected to serve another one year term. The Chapter's 1955 Home-Equipment Award went to the city of La Grange.

NEW POLY-CIDE



GARBAGE AND RUBBISH TRUCKS: Even after a thorough rinsing with water these vehicles will have a residual odor. A POLY-CIDE water mix can be used to spray the truck to completely remove all odors.

REFUSE CANS: Weekly spraying of refuse cans with water mixture of POLY-CIDE will be beneficial in controlling objectionable odors. The POLY-CIDE can be applied at the time the refuse is picked up by the rubbish truck.

PUBLIC REST ROOMS AND JAILS: POLY-CIDE combines a fresh pine *needle* odor together with an effective bacteriostatic material. A water mixture will deodorize and sanitize at the same time.

A variety of POLY-CIDE formulations are available, each with special characteristics. Often times more than one formulation can be used for a specific application. On the other hand, some applications require a specific formulation to obtain effective results. Each formulation is in liquid form and readily miscible with water.

Brooks Service Engineers are available anytime, anywhere.

BROOKS Chemicals, Incorporated
3304 East 87th Street, Cleveland 27, Ohio — Offices in Principal Industrial Cities

It's a fact . . . our handy Readers' Service card is the way to get new catalogs.

PUBLIC WORKS DIGESTS

The INDUSTRIAL WASTE *Digest*

Anaerobic Activated Sludge Process for Packinghouse Wastes

This process has been developed by specialists employed by George A. Hormel & Co. at their plant in Austin, Minn. In its latest form it removes 95 percent of the BOD and 90 percent of the suspended solids at loadings up to 0.20 lb. of BOD per cu. ft. of digester volume per day—loads four times the rate possible for conventional aerobic processes. An essential of the process is contact between the raw waste and biologically active anaerobic sludge. Better results in this process at higher loadings are explained partly by the temperature advantage and by the fact that the suspended solids in the mixed liquor can be maintained near 15,000 ppm, as compared to the 2,000 to 3,000 ppm possible in the conventional activated sludge. The process differs from other anaerobic applications by reason of the development of a method of separation employing degasification. The separation process reduces the suspended solids from 12,000-17,000 ppm to 20-100 ppm. It is estimated that the construction costs of this process would be approximately one-half of those of trickling filter plants designed for 95 percent BOD removal, and the operation and maintenance costs slightly greater; giving a total annual charge 70 to 80 percent of that for trickling filter plants.

The plant consists of a small holding tank, from which the wastes are pumped to a digester, activated anaerobic sludge being added to them. The digester contents are constantly mixed by a pump, drawing from the bottom of the digester and discharging at high velocity against 6-in. diameter plates above the liquid surface. Overflow from the digester is drawn into an evacuator by a vacuum of 20 or more inches of mercury; the influent passing in cascades down over six levels of splash trays. Effluent from this enters a separator, the sludge from which is pumped back to the digester, while the clarified effluent goes to a trickling filter. During the development of the process, use of fly ash as a weighting material was tried and discarded. The flotation process was found to be less efficient and economical than the evacuation process employed.

"The Anaerobic Contact Process as Applied to Packinghouse Wastes". By Prof. George J. Schroepfer, Univ. of Minnesota; W. J. Fullen, Chemist, Geo. A. Hormel & Co.; A. S. Johnson and N. R. Ziemke, instructors, Univ. of Minn.; and J. J. Anderson, American Meat Institute. *Sewage and Industrial Wastes*, April.

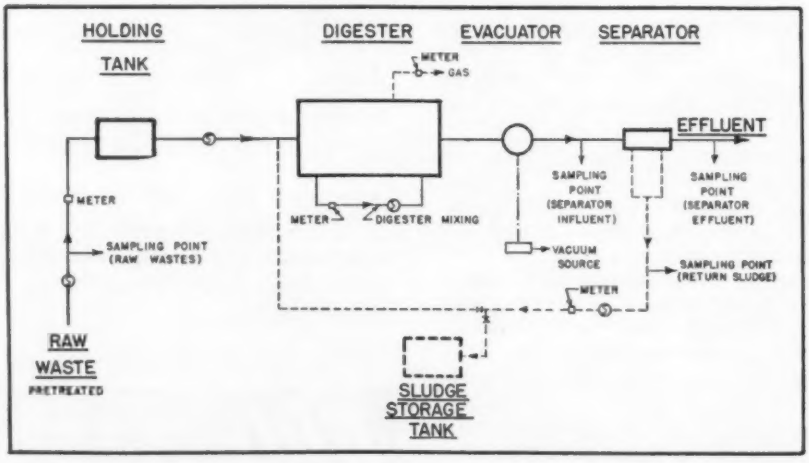
Treatment of Antitoxin and Vaccine Wastes

The Greenfield Laboratories of Eli Lilly & Co. consist of laboratories, animal stalls and farms. The wastes, totaling 15,000 gpd, contain 4,000 to 8.500 ppm total solids, of which 3,000 to 7,500 are volatile; the BOD is 1,000 to 1,700 ppm; the pH is 7.3 to 7.6. They contain waste blood; equipment and floor washings; waste chemicals; animals excreta; spoiled eggs; etc. The wastes, with coarse solids removed, are pumped to an Imhoff tank, and thence to a trickling filter and final settling tank. Sludge from the latter is returned to the wet well or recirculated for sedimentation. The effluent averages 12.3 ppm or less of BOD; 7.7 pH; 508 suspended solids; 318 ppm M.O. alkalinity.

"Antitoxin and Vaccine Wastes Treated at Eli Lilly Plant". By R. H. L. Howe and D. G. Coates. *Wastes Engineering*, May.

Treatment of Repair Shop Wastes

The U.S. Army Engineers are constructing an unusual plant for treating the wastes from an ordnance depot at Chambersburg, Pa. These wastes will consist of an almost continuous flow of wash water from washing the vehicles preparatory to repairing, and intermittent batch discharges from rust removing, paint stripping, painting, plating and other operations. A composite of these contains appreciable amounts of free and emulsified oil, a high pH, large quantities of suspended and dissolved solids, and (surprisingly) a BOD comparable to that of sanitary sewage, probably from organic material in the dried mud on the tracks of the vehicles. In treatment, the wash water will flow to a wet well and the shop wastes to another well, and the latter will be added to the former at an equalized rate. Oil, grit and mud



Courtesy Sewage & Industrial Wastes

● **FLOW diagram of anaerobic contact process for packinghouse wastes.**

at last! a 100% NON-CLOGGING SEWAGE PUMP

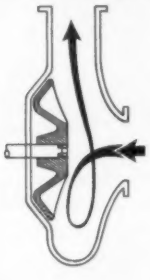
THE WEMCO TORQUE-FLOW SOLIDS PUMP

Rags, stringy fibrous materials and thick sludges can flow through this pump indefinitely without accumulating or clogging. Bar screens can be eliminated — pump inspection periods can be lengthened — and messy pump teardowns become almost a thing of the past.

FIELD PROVEN BY LOS ANGELES COUNTY SANITATION DISTRICT

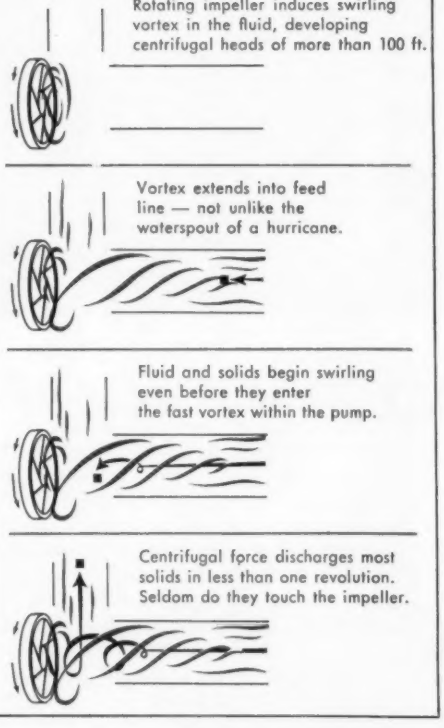
A "hand made" early model Wemco Pump was installed on a 90 day trial pumping raw settled sludge. Previous modern pumps had been ragging-up in excess of four times per week. The trial period was completely successful. Not a single stoppage occurred. Even this hand made model is still in continuous operation after more than fourteen months. This resulted in many additional pumps being installed at other critical points in the system.

COMPLETELY NEW IN CONCEPT



Success of the Wemco Torque-Flow Solids Pump is due to its unique new principle. Nowhere is its flow passage narrower than the discharge — and there are no rag catching projections, corners, or edges. The impeller is recessed from the main flow. It pumps by inducing a vortex and swirl. It will create suction lifts greater than 20 feet or pump heads of 100 feet and more.

Here is how it works


Rotating impeller induces swirling vortex in the fluid, developing centrifugal heads of more than 100 ft.
Vortex extends into feed line — not unlike the waterspout of a hurricane.
Fluid and solids begin swirling even before they enter the fast vortex within the pump.
Centrifugal force discharges most solids in less than one revolution. Seldom do they touch the impeller.

Write for full particulars to Dept. M-2045

WEMCO®
WESTERN MACHINERY COMPANY
760 FOLSOM STREET • SAN FRANCISCO 7, CALIFORNIA
50 CHURCH STREET • NEW YORK, NEW YORK
129 ADELAIDE STREET WEST • TORONTO, CANADA
20 BOULEVARD MALESHERBES • PARIS (8E), FRANCE

REPRESENTATIVES IN PRINCIPAL CITIES OF THE UNITED STATES AND CANADA AND IN MAJOR COUNTRIES THROUGHOUT THE WORLD

Need more facts about advertised products? Mail your Readers' Service card now.

will be removed from the combined wastes by gravity separation. The pH of these wastes, which ranges from 7.0 to 10.0, will be adjusted to approximately 8.0 by use of sulfuric acid. Chemical precipitation with flash mixing, mechanical flocculation and sedimentation will remove additional solids, reduce emulsified oil, BOD, etc.; part of the sludge from which will be returned to the flocculator in order to reduce chemical costs, and the rest wasted to a lagoon. The effluent from the chemical precipitation will be treated on a high-rate filter to reduce further the BOD, oil and phenol content; followed by final sedimentation.

"Combined Chemical Treatment and High Rate Filtration". By John T. Starr, Chief, Planning and Reports Branch, Corps of Engineers. *Wastes Engineering*, May.

Removing Waste Liquids From a Plant

In constructing a building devoted to heat treating, plating and plastic molding operations, International Business Machine Corp. provided a system of trenches in the concrete floor for conducting away the liquid wastes. Leak and acid-proofing was accomplished by use of polyvinyl plastic sheeting on the inside of the trenches. Cyanide and chrome wastes are individually separated from the general rinse wastes to enable a separate treatment of each. General rinse liquids flow in collection trenches to a manhole, from which they are pumped through a series of three diatomite filters and then to ion exchangers, containing both anion and cation tanks. Cyanide wastes are led to an 18,700-gal. settlement tank, with effluent chlorinated before discharge into the receiving body. Chrome wastes are treated in a closed system that not only reclaims chromates, but recovers caustics as well. Chromate is demineralized in two banks of small ion exchangers, and the effluent is neutralized in a 37,700-gal. tank. Chromate recovery is so high that recirculation of residual chromate waste does not affect recovery process. Caustic recovered is stored for re-use.

"Unique Waste System Built Into Plant." *Engineering News-Record*, May 19.

Remedial Measures in Industrial Air Pollution

Air pollution problems at Procter and Gamble do not, as far as is known, create any physical problems, but they can, if not handled properly, create mental health problems in that they may annoy neighbors. It is with this viewpoint that the air pollution control problem is approached. The main problems are in two broad categories—the discharge of dusts or particulate matter and the discharge of odorous vapors. Dust discharges to the atmosphere are primarily controlled as a matter of course in plant design, consequently the remaining problem of dust discharge to the atmosphere is relatively small.

The problems of odorous discharges are harder to cope with than dusts; possibly due to the general lack of knowledge in the field of odor control and measurement. The Engineering Division of the Company has, during the past nine years, been developing methods of odor measurement and control in order to place them on a more rational basis. In this respect a quantitative concept of odor has been developed which measures odor directly without regard to the material that produces it. An odor unit has been established as the amount of odor, regardless of the origin, necessary to contaminate one cubic foot of air to odor threshold

Plan with Quality...

Pekrul

4-36" Pekrul model 45A Sluice gates at Sacramento Sewage Treatment plant

City managers...engineers... contractors...know that the precision engineering and quality construction of Pekrul Gates means a *planned* water control project that will fulfill its purpose. It costs no more to plan with quality...specify Pekrul Gates on your next project.

PEKRUL GATE DIVISION

Write on your letterhead for NEW Pekrul Gate Catalog No. 55

MORSE BROS. MACHINERY
DENVER, COLORADO

MANUFACTURERS OF PEKRUL GATES FOR

Flood Control · Sewage Disposal · Rearing Ponds · Recreation Pools
Levees · Reservoirs · Irrigation · Cooling Towers · Pumping Plants
Water Works · Oil Refineries · Steel Mills · Dams · Fish Hatcheries

Get full details of this month's products . . . mail your Readers' Service card today.

Need more facts about advertised products? Mail your Readers' Service card now.

ASK THE CITIES* THAT USE IT!

Learn why

BERMICO®

SEWER PIPE

is going into more plumbing codes than ever before

*Complete list on request.

Modern-minded sanitary engineers in cities and towns across the land are now specifying BERMICO—because *only* bituminized-fibre pipe offers these three important advantages—

1. DURABILITY—Made of tough wood fibre impregnated with pitch, BERMICO is strong, root-proof, corrosion-proof—gives dependable protection against pipe-line failure.

2. ECONOMY—Because its light-weight, 8-foot lengths install faster and easier, BERMICO saves money. In fact, you can't buy *lower-cost* root-proof pipe installed for sewer lines and drainage.

3. PROVEN DEPENDABILITY—Millions of feet of BERMICO are giving trouble-free service in America's communities from coast-to-coast.

Your community can take advantage of this "Modern Pipe for Modern Living" by modernizing your plumbing code to include BERMICO. For information write Dept. BE-7, BROWN COMPANY, 150 Causeway Street, Boston 14, Mass.

Thousands use our Readers' Service card to keep up to date . . . do you?

ZIPS THROUGH THEM ALL!

- ☑ GREEN CONCRETE
- ☑ CURED CONCRETE
- ☑ ASPHALT

CS 500 CONCRETE SAW
Perfectly balanced and maneuverable with a powerful 14.6 h.p. engine.

EASIER-FASTER-CHEAPER!

Champion CONCRETE SAWS

This rugged, yet compact Champion harnesses 14.6 horses to get clean, straight bites in asphalt, green and cured concrete. Champion's compact and perfectly balanced design produces speedy cuts, saves important on-the-job time and labor costs, maneuvers easily in confined areas... cuts right into closest corners with Champion's "either-side" blade arrangement. Ask your distributor about the Champion or write direct. Champion's labor and money-saving features are worth checking into!

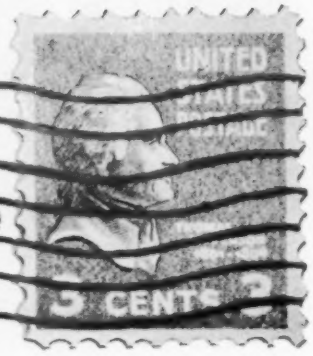
- Powerful 14.6 h. p. Gasoline Engine.
- Non-Sway Ball-Bearing Solid Rubber Wheels.
- Positive Screw Feed with Adjustable Positive Depth Stop.
- Dual Purpose Blade Guard for Either-Side Cutting.

Sidewalk Patching with a Champion. Even well-cured, dense concrete like this is zipped through faster — and for less — by a Champion.

BUY *Champion* BLADES FOR ALL CUTTING

Champion MFG. CO.
2028 WASHINGTON AVE., ST. LOUIS 3, MO., U.S.A.

Better spend 3¢ for the facts—



before you spend thousands for pipe replacement!

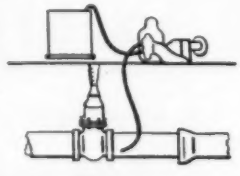
If you are considering replacing clogged pipe or water mains with new pipe, why not find out first how *much* you can save by having Flexible clean that pipe...

- • • YOU SAVE ON THE COST OF NEW PIPE
- • • YOU SAVE ON PUMPING COSTS
- • • YOU SAVE ON INSURANCE RATES
- • • YOU SAVE ON LABOR
- • • YOU INSURE GREATEST POSSIBLE WATER SUPPLY AT LOWER OPERATING COST

Whatever your next job may be—send today for Flexible's preliminary job cost estimate form. Flexible's long experience in cleaning pipe from 2 inches to 12 feet in diameter at 1/7th to 1/30th the cost of pipe replacement (depending on pipe size) means a substantial saving. Clogged pipes cleaned by Flexible have been restored to 90% of new pipe efficiency.

Send today for your preliminary job estimate form. We'll be glad to provide our estimate for your particular job, without cost or obligation.

STERILIZING WATER MAINS
Flexible has specialized equipment and crews. Write for details!



f-l-e-x-i-b-l-e
pipe cleaning company

9324 So. Norwalk Blvd., Los Nietos, Calif. • P.O. Box 167 • OXford 5-5713
P. O. Box 191, South Houston, Texas • HUdson 6-7927

It's a fact . . . our handy Readers' Service card is the way to get new catalogs.

Thousands use our Readers' Service card to keep up to date . . . do you?

or the "barely detectable" level. By measuring odor concentrations and cfm flow rates from various vents, odor emission rates, in odor units per minute, can be calculated for various discharges and compared on a common basis. Since most standard laboratory procedures are somewhat ill-suited for measuring highly concentrated odors in process vents, a special sampling system was devised and nicknamed the OSMO. This device consists essentially of a continuous flow of 10-20 cfm odor free reference air into which increasing amounts of odorous sample are introduced, until odor is detected in the exit mixture. The ratio of total diluted flow rate to sample flow rate at the threshold point is measured and is the odor concentration of the sample in odor units per cubic foot. Although extremely helpful, the instrument is subject to variations as high as ±25-50 per cent, for one observer. It is sometimes subject to errors due to condensation or to contamination of the equipment. At the present stage, it must be used by a trained engineer who can use intelligent judgment in interpreting results.

Reduction of pollution discharge by changed operating technic is attractive because it involves little or no investment but requires constant vigilance and determination on the part of supervision and plant management. Such an attitude can probably do as much to control odors from a plant as all the odor control equipment that can be installed.

Process changes to reduce odor discharge should always be considered and finally the use of special equipment such as spray condensers, enclosed vent systems, packed scrubbers, odor furnaces, activated carbon filters, centrifugal separators, air filters, and dispersal by stacks should be studied.

Remedial Measures in Air Pollution which have been taken by an industry including a discussion of costs. Virgil E. Gex, Research and Development Div., Procter & Gamble Co., Cincinnati, Ohio. *American Journal of Public Health.* May.

Acetovanillone Determination

The oxidation of waste sulfite liquor in strong caustic solution at elevated temperatures produces vanillin, vanillic acid, acetovanillone, guaiacol, and other substances with a guaiacol nucleus. A paper

MAKE YOUR LAWN AREAS "THE PRIDE OF THE TOWN"

E.W.T. SELECTIVE WEED-KILLER

Keep your lawn areas, seeded traffic islands and other improved areas the beauty spots they should be—with E.W.T. *Selective* Weed-Killer. Non-injurious to most grasses, but one spraying in economical solution (a cupful to 24 gallons of water) has proven successful for clearing rights-of-way of poison ivy, barberry, honeysuckle, poison sumac, locust, wild cherry and other persistant perennials and shrubs—including many species of common broad-leaved noxious weeds.

AND . . . WHERE NO VEGETATION WHATEVER IS WANTED . . .

DOLGE SS WEED-KILLER

Ideal for your parking areas and driveways, along fences and abutments. KILLS vegetation and wind-blown seeds on contact, then works down through the soil to the roots, sterilizing the surrounding earth. Here is truly effective, long-lasting protection against unwanted plant growth.

Please write for illustrated, easy-to-understand literature on scientific weed control. Your Dolge Service Man, too, will be glad to answer your questions.

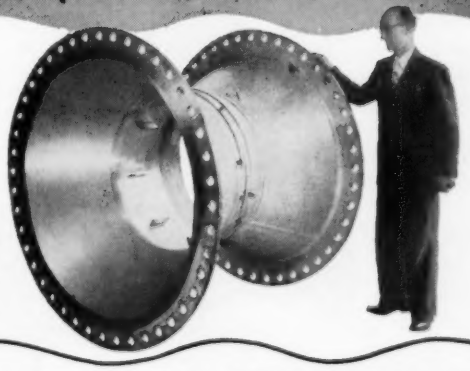
FOR FREE SANITARY SURVEY of your buildings see your DOLGE SERVICE MAN

dependable DOLGE

WESTPORT, CONNECTICUT

FOR *FLOW MEASUREMENT*

*only the Gentile** FLOW TUBE *manufactured by* FOSTER *offers you all these* ADVANTAGES:



*Gen-til-'ly

ACCURACY — Produces differential from points of equal cross-sectional area . . . furnished with head capacity curves, and guaranteed for exceptional accuracy when used with any standard indicating, recording or integrating meter.

LOW HEAD LOSS — Available in several types and D/d ratios to provide differentials that can be accurately measured with least head loss.

LOW INSTALLED COST — Average length is only 1½ times the pipe diameter, and straight runs entering and following are not required unless installed near throttling valves or regulators.

Write for Bulletin FT-101 or specific recommendations

FOSTER ENGINEERING COMPANY

835 LEHIGH AVENUE UNION, N. J.

AUTOMATIC VALVES • CONTROL VALVES • SAFETY VALVES • FLOW TUBES

Now's the time to mail this month's Readers' Service card.

Setting machinery?

use **non-shrink**
EMBECO GROUT
NOW READY-TO-USE

send for booklet

Whatever the grouting job — heavy equipment, machinery, anchor bolts, building columns, etc. — Embeco Pre-Mixed Grout will give you *lasting* results.

Embeco Pre-Mixed Grout produces a *flowable* grout that is *non-shrink*...insures full bedplate contact... maintains alignment...has high impact-resistance.

Recommended by leading equipment manufacturers everywhere. EMBECO PRE-MIXED GROUT IS READY TO USE—you add only water. Write for 8 page illustrated booklet.

Creators and Manufacturers of Products to Improve Concrete and Mortar

THE MASTER BUILDERS CO.
CLEVELAND 3, OHIO — Subsidiary of American-Marietta Company — TORONTO 9, ONTARIO

SPARLING **WATER CONTROL EQUIPMENT**

SPARLING METROVALVES
Measure the Quantity—Regulate the Rate

The Sparling Main-Line Meter combines with a Sparling Hydrovalve and electric Telechron Motor to regulate or terminate the flow at any set point on the Selector scale. Built in all meter sizes from 4-inch up to 16-inch.

Write for Form 575

SPARLING METER COMPANY
INCORPORATED

ATLANTA 3.....66 Luckie Street NW
BOSTON 8.....6 Beacon Street
CHICAGO 8.....1500 South Western Ave.
CINCINNATI 2.....626 Broadway
DALLAS 1....726 Reserve Loan Life Bldg.
KANSAS CITY 6, MO.....6 E. Eleventh St.
Box 3277.....LOS ANGELES 54
101 Park Avenue.....NEW YORK 17
6530 Forbes St.....PITTSBURGH 13
85 Industrial St.....SAN FRANCISCO 24
1932 First Avenue.....SEATTLE 1
207 Queens Quay West....TORONTO, CAN.

Need more facts about advertised products? Mail your Readers' Service card now.

chromatographic method for determining the acetovanillone content of oxidized alkaline cleaved waste sulfite liquor has been developed. By the action of the developing solvent, vanillin, acetovanillone, **p**-hydroxybenzaldehyde and vanillil are separated from the other organics but not completely from each other. The action of the developing solvent is supplemented by the use of a bisulfite "block" which retards the vanillin and **p**-hydroxybenzaldehyde. The acetovanillone may then be determined in the presence of vanillil. The paper chromatograph is prepared by saturating Whatman's No. 1 filter paper with sulfite liquor in a measured quantity, acidifying the paper, adding a band of sodium metabisulfite, humidifying the paper and developing by dipping it in n-butyl ether. The acetovanillone band can then be detected by ultraviolet light, cut from the paper and leached in a phosphate buffer solution. The absorbance of the solution is measured by a spectrophotometer, and the concentration of acetovanillone is calculated. An accuracy within plus or minus 5% is indicated.

"Determination of Acetovanillone in Oxidized Alkaline Cleaved Sulfite Liquor by Paper Chromatography," by E. T. Reaville and G. W. Shreve, Monsanto Chemical Co. *Analytical Chemistry*. April

Other Articles

"**Industrial Waste** Specifications in Municipal Ordinances". Sewage and Industrial Wastes, May.

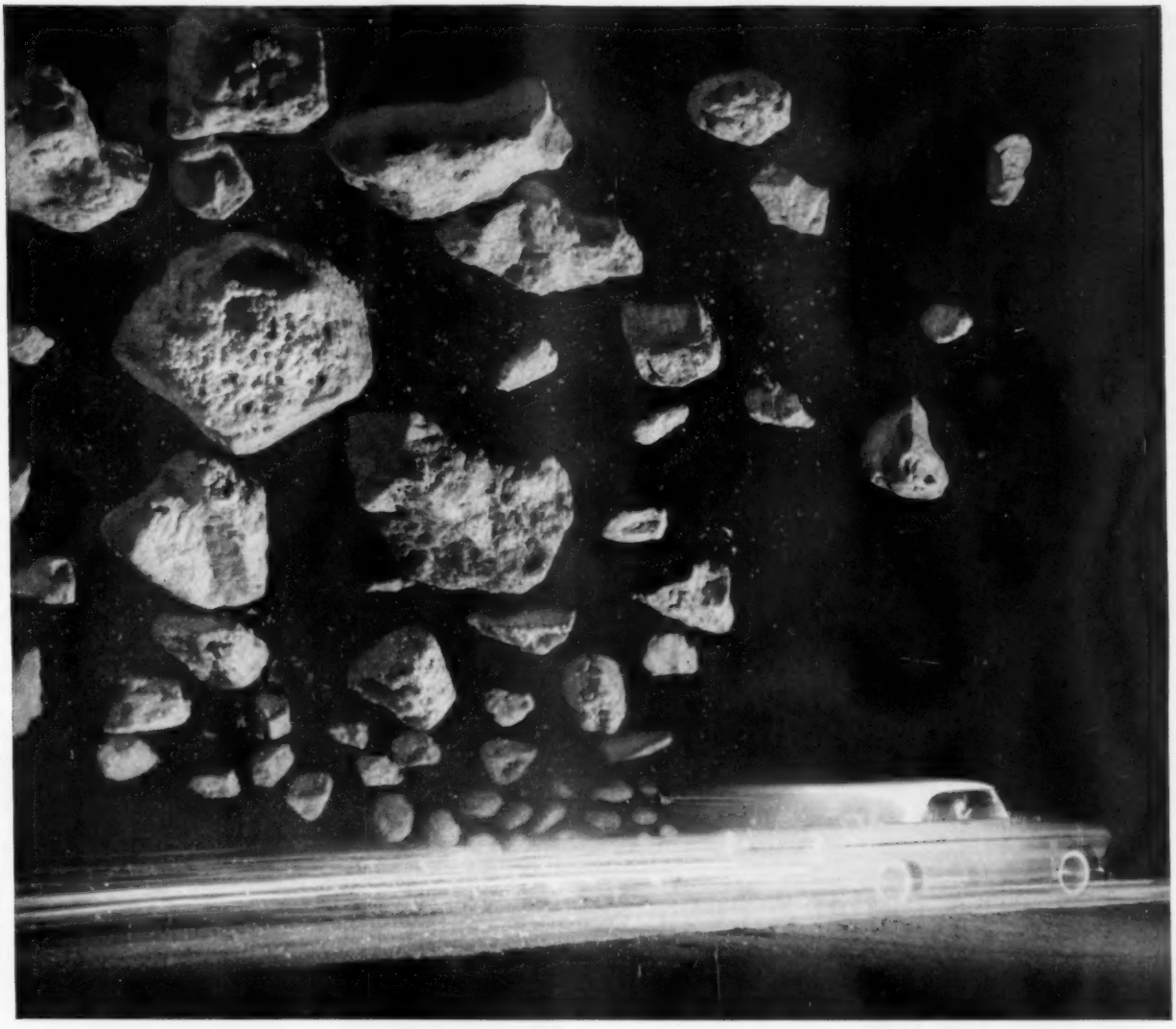
• • •

Salt Stabilization

(*Continued from page* 78)

what other construction can be done day after day on an average of one mile a day? By the way, our progress on this project would have been the same if the road had been 20 feet wide instead of 18.

This project proved to us even more the latitude allowable in rock salt stabilization. We had trouble with our salt spreader in the beginning. The tailgate stuck open and the salt started flowing without control. Our quick-thinking driver stepped on the gas. The result was a thick layer of nine tons of rock salt on a section only about 1000 feet long by ten feet wide. We left this salt in place and stabilized to see what would happen. Today, this section is standing up well and is not noticeably different from the other which received our normal average



Keep that Gravel Grounded !

Stabilize your roads with Morton Salt

- **Cut aggregate loss**
- **Save man-hours and maintenance money**
- **Reduce accidents caused by loose gravel**

Gravel roads stabilized with Morton Salt give more service per dollar than roads built by any other method. (Savings in aggregate alone more than pay for the salt.) You get smooth, durable, water-repellent surfaces that require minimum maintenance.

Stabilizing the base course of primary roads with Morton Salt helps prevent the 9 out of 10 road failures which result from faulty foundations.

Send for this free book on how Morton Salt helps you build better roads at far less cost! *Mail this coupon today!*

MORTON SALT COMPANY
Industrial Division, Dept. PW-7
120 So. LaSalle Street, Chicago 3, Illinois

Please send me your free booklet on salt stabilized roads.

Name_____

Title_____

Address_____

City_____ County_____ State_____

Get full details of this month's products . . . mail your Readers' Service card today.

of six tons of rock salt for an 18-ft. wide mile.

Another typical problem that rock salt solved for us last season was in a 500-ft. cut. We struck red clay, which was very runny, and in the cut we had a severe water condition. Putting in a weeper pipe which drains both ways, we added 18 to 24 inches of gravel and stabilized the top eight inches with rock salt. Results are excellent and this cut has gone through the winter well.

All in all, rock salt stabilization is giving us a chance to catch our breath and to put our limited funds into the major roads on our county system; at the same time it is giving us better gravel roads than we have ever had. With shoulder stabilization coming up in 1955 we will have even a better feeling of real accomplishment and will be closer to answering the ever-present question of what to do with our roads with only limited funds.

• • •

"Doc" Symons

(*Continued from page* 22)

these National meetings and I strongly feel they should be continued. There are more and more cities with plans for convention facilities, which should give the Convention Place Committee in the future more latitude in choosing cities for the National conventions.

"A great deal has been made of the fact that attendance at the National conventions has been increasing year by year, as evidenced by the partial list included in your column. Actually, however, this increase is mainly on account of the ladies in attendance and it seems to me that the inclusion of the ladies as registrants at the conventions is a little bit misleading. Nevertheless, I feel it is a good trend to have the ladies present because I think it holds the conventions on an even keel and certainly it has made the meetings less boisterous than they were in the days when very few ladies attended.

"The big difficulty, however, has to do with the question of expenses to a convention and the salaries of the superintendents who would like to attend. There are some states, I believe, where the cities cannot legally pay the expenses of municipal officials to conventions outside the state borders. Also, as you know, the salaries of many of the water department officials are not sufficient for them to pay their own expenses to National conventions regardless of where it is located.

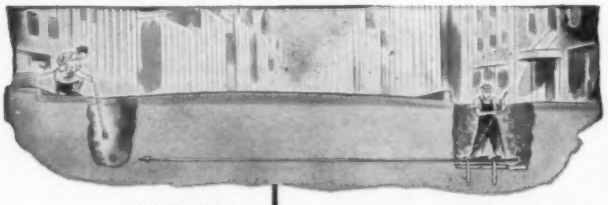
It seems to me, therefore, we are confronted with a very considerable selling program to convince municipal officials that the National conventions are worth while and that by sending their water department personnel to such conventions they will more than make up the expense involved by information these people will obtain. The other phase of the selling program is to convince municipalities that the water superintendent is a valuable man in the community and that he should be paid accordingly. It is a well known fact that the water superintendent or water manager is not paid anywhere near the salary that industry pays a man with similar responsibilities, with the net result that in many cases it is difficult to secure competent personnel to operate the water department.

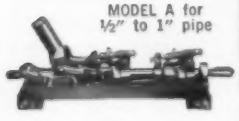
"It is possible, in so far as exhibits are concerned, that some compromise could be made by limiting the number of booths any one manufacturer could take, which might cut down the total space required to some small extent. I have

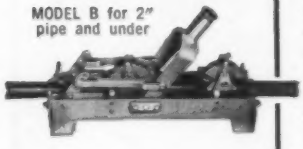
Trojan Pipe Puller & Pusher

installs or renews pipe under pavement

in half the time required by any other machine!







Exclusive continuous action, which eliminates all resetting of grip, does the trick!

The Trojan combines pushing and pulling operations in one machine —keeps pipe continuously moving —lets you install 40′ services in as little as 20 min.

Model A needs only 5′ trench. One man can easily install the average service. 15 tons of pushing pressure possible.

Model B is reversible in 30 seconds—has 3 speeds for different soils. New dog with individual inserts cuts maintenance.

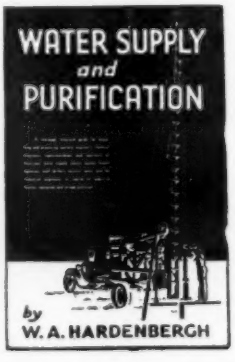
Write today for full details!

The TROJAN Manufacturing Co.

1114 Race Drive • Troy, Ohio

Water Supply & Purification

by Col. W. A. Hardenbergh



A Useful Book For Your Engineering Library Only $6.50

Write to:

Book Department
Public Works Magazine
310 East 45th Street
New York 17, New York

Among the major changes introduced in this latest edition are the following: the chapters on ground water, on filtration, and on laying pipe and maintaining lines have been almost completely rewritten; the chapters on pipe conduits and on disinfection have been revised to bring the material in them up to date; and a new chapter has been added on fluoridation. Also, there are new appendices. One of these, "Planning for Emergencies and Civil Defense," contains the available information on bacteriological and radiological warfare and protection against sabotage as these subjects pertain to water works.

Order your copy today

Thousands use our Readers' Service card to keep up to date . . . do you?

DIRECTORY Consulting Engineers

ABRAMS AERIAL SURVEY CORPORATION

Photogrammetric Engineers for more than a third of a century.
Aerial Photography — Atlas Sheets — Mosaics — Plan and Topographic Maps — Profiles — Infrared Photography.

Photo-interpretation Instruments
618 E. Shiawassee St. Lansing, Michigan

ALBRIGHT & FRIEL INC.

Consulting Engineers
Water, Sewage and Industrial Wastes Problems
Airfields, Refuse Incinerators, Dams
Power Plants, Flood Control
Industrial Buildings
City Planing, Reports, Appraisals and Rates
Laboratory
121 SOUTH BROAD ST. PHILADELPHIA 7

ALVORD, BURDICK & HOWSON

Engineers
Water Works, Water Purification, Flood Relief, Sewerage, Sewage Disposal, Drainage, Appraisals, Power Generation
20 No. Wacker Dr. Chicago 6, Ill.

MICHAEL BAKER, JR., INC.

THE Baker Engineers
Civil Engineers, Planners, and Surveyors
Airports, Highways, Sewage Disposal Systems, Water Works Design and Operation—City Planning—Municipal Engineering—All types of Surveys
Home Office: Rochester, Pa.
Branch Offices:
Jackson, Miss. Harrisburg, Pa.

BANISTER ENGINEERING CO.

Consulting Engineers
POWER PLANTS, WATERWORKS, CITY PLANNING, RURAL ELECTRIFICATION, SANITATION, WASTE PROBLEMS, AIRPORTS, STREET IMPROVEMENTS
1549 University Ave.
St. Paul 4, Minn.

BARKER & WHEELER

Engineers
Water Supply, Sewerage, Sewage Disposal, Power, Public Utility and Industrial Valuations and Rates
36 State Street, Albany 7, N. Y.
11 Park Place, New York City 7

HOWARD K. BELL

Consulting Engineers
G. S. Bell C. G. Gaither J. K. Latham
J. W. FINNEY, JR., Assoc.
Water Works — Sewage Disposal
Water Purification — Sewerage
Swimming Pools — Refuse Disposal
Industrial Wastes
553 S. Limestone St. Lexington, Ky.

BLACK & VEATCH

Consulting Engineers
Water—Sewage—Electricity—Industry
Reports, Design, Supervision of Construction
Investigations, Valuations and Rates
4706 Broadway Kansas City 2, Missouri

BOGERT AND CHILDS

Consulting Engineers

Clinton L. Bogert	Fred S. Childs
Ivan L. Bogert	Donald M. Ditmars
Robert A. Lincoln	Charles A. Manganaro
William Martin	
Water & Sewage Works	Refuse Disposal
Drainage	Flood Control
Highways and Bridges	Airfields

624 Madison Avenue, New York 22, N.Y.

BOWE, ALBERTSON & ASSOCIATES

Engineers
Water and Sewage Works
Industrial Wastes—Refuse Disposal—Municipal Projects
Airfields—Industrial Buildings
Reports—Designs—Estimates
Valuations—Laboratory Service
110 William St., New York 38, N.Y.

FLOYD G. BROWNE AND ASSOCIATES

Consulting Engineers
F. G. Browne, J. R. Patterson, S. W. Kuhner
R. D. Seidel, G. M. Hinkamp, W. G. Smiley
Water Supply and Purification; Sewage and Industrial Waste Treatment; Refuse Disposal, Power Generation and Electric Systems; Surveys; Reports; Valuations and Rates.
Marion, Ohio

BROWN ENGINEERING CO.

Consulting Engineers
Waterworks, Sewage Disposal, Airports
Street Improvements, Power Plants
Electric Distribution, Rates
K. P. BUILDING DES MOINES, IOWA

BROWN & BLAUVELT

Consulting Engineers

Railroads	Water Supply
Highways	Sewage Disposal
Bridges	Industrial Plants
Airports	River Developments

Telephone: Lexington 2-7581
468 Fourth Ave., New York 16, N.Y.

BUCK, SEIFERT AND JOST

Consulting Engineers
(FORMERLY NICHOLAS S. HILL ASSOCIATES)
Water Supply Sewage Disposal
Hydraulic Developments
Reports, Investigations, Valuations
Rates, Design, Construction, Operation Management, Chemical and Biological Laboratories
112 East 19th St. New York City

BURGESS & NIPLE

Consulting Engineers
Established 1908
Water supply, treatment and distribution
Sewage and industrial wastes disposal
Investigations, reports, appraisals, rates
Airport, Municipal Engineering, Supervision
2015 West Fifth Ave. Columbus 12, Ohio

RALPH H. BURKE, INC.

Consulting Engineers
Traffic Studies Underground Garages
Parking Structures Grade Separations
Expressways, Airports and Terminal Buildings
Shore Protection Municipal Engineering
Parks Field Houses Swimming Pools
20 North Wacker Drive, Chicago 6, Ill.

BURNS & McDONNELL

Consulting and Designing Engineers
Kansas City 2, Mo. Cleveland 14, Ohio
P.O. Box 7088 1404 E. 9th St.

JAMES M. CAIRD

Assoc. Am. Soc. C. E.
Chemist and Bacteriologist
Water Analysts and Tests of Filter Plants
Office and Laboratory
Cannon Bldg., Broadway & 2nd St.
Troy, N.Y.

CAMP, DRESSER & McKEE

Consulting Engineers
Water Works and Water Treatment
Sewerage and Sewage Treatment
Municipal and Industrial Wastes
Investigations and Reports
Design and Supervision
Research and Development
Flood Control
6 Beacon St. Boston 8, Mass.

CAPITOL ENGINEERING CORP.

Engineers—Constructors
Management

Water Works	Sewage Systems
Design and Surveys	Roads and Streets
Planning	Airports
Bridges	Dams

Executive Offices
DILLSBURG, PENNSYLVANIA

THE CHESTER ENGINEERS

Water Supply and Purification
Sewage and Industrial Waste Treatment
Power Plants—Incineration—Gas Systems
Valuations—Rates—Management
Laboratory—City Planning
210 E. Park Way, Pittsburgh 12, Penna.

CHAS. W. COLE & SON

Engineers—Architects
Sewerage, Water Supply, Bridges, Highways, Toll Roads, Industrial, Municipal and Commercial Buildings
220 W. LaSalle Ave., Central 4-0127
South Bend, Indiana

CONSOER, TOWNSEND & ASSOCIATES

Water Supply — Sewage — Flood Control & Drainage — Bridges — Express Highways — Paving — Power Plants — Appraisals — Reports — Traffic Studies — Airports
Gas & Electric Transmission Lines
351 East Ohio Street
Chicago 11, Ill.

AIR SURVEY CORPORATION

Photogrammetric Engineering
1101 LEE HIGHWAY, ARLINGTON 9, VIRGINIA

Precise Topographic and Planimetric Maps
Tax Maps and Atlas Sheets
Controlled Photo Maps
Route and Location Surveys
Field Surveys
Aerial Photography

COTTON, PIERCE, STREANDER, INC.
Associated Engineering Consultants
132 Nassau Street, New York 7, N.Y.
1405 W. Erie Avenue, Phila. 40, Pa.
6 Beacon St., Boston 8, Mass.
55 Carolina Rd., Gowanda, N.Y.
Water Supply, Treatment, Distribution—Sewage, Sewage Treatment, Refuse Disposal, Air Pollution, Power Plants, Incinerator Plants, Reports, Plans, Supervision—Laboratory Service.

DE LEUW, CATHER & COMPANY
Consulting Engineers
Public Transit, Traffic and Parking Problems
Railroads — Grade Separations
Major Thoroughfares — Expressways
Subways — Tunnels
Power Plants — Municipal Works
150 North Wacker Drive, Chicago 6, Ill.
79 McAllister St., San Francisco 2, Calif.

FRIDY, GAUKER, TRUSCOTT & FRIDY, INC.
Architects & Engineers
Hospitals, Schools, Industrial Buildings, Public Buildings, Airports, Roads, Water, Sewage, Petroleum Facilities, Waste Disposal, Power & Lighting, Reports, Plans, Supervision, Appraisals.
1321 Arch Street — Philadelphia 7, Penna.

GANNETT FLEMING CORDDRY & CARPENTER, Inc.
Engineers
Water Works, Sewage, Industrial Wastes & Garbage Disposal
Roads, Airports, Bridges & Flood Control
Traffic and Parking, Appraisals, Investigations & Reports
Pittsburgh, Pa. — Philadelphia, Pa.
Daytona Beach, Fla. — Pleasantville, N. J.
HARRISBURG, PENNA.

Earth Dam Designs by
GREER ENGINEERING ASSOCIATES
Site Investigations and Studies — Foundation Designs and Analyses — Airphoto Soils and Geological Mapping — Undisturbed Sample Borings — Field and Laboratory Soil Tests — Geological Studies — Supervision of Earth Fills.
98 Greenwood Ave. — Montclair, New Jersey

GILBERT ASSOCIATES, Inc.
Engineers and Consultants
Power Plant Engineering
Water Supply and Purification
Sewage and Industrial Waste Treatment
Chemical Laboratory Service
New York — READING, PA. — Philadelphia

GREELEY & HANSEN
Engineers
Water Supply, Water Purification
Sewerage, Sewage Treatment
Flood Control, Drainage, Refuse Disposal
220 S. State Street, Chicago 4

HOWARD R. GREEN CO.
Consulting Engineers
DESIGN AND SUPERVISION OF MUNICIPAL DEVELOPMENTS
Water Works and Treatment—Sewers and Sewage Disposal—Investigations and Valuations
208-10 Bever Bldg., Cedar Rapids, Iowa
Established 1913

Frank E. Harley and Associates
Consulting Engineers
Water Supply and Purification
Sewerage and Sewage Treatment
Industrial Wastes and Garbage Disposal
Municipal Improvements, Town Planning
Surveys
Design, Supervision and Operation
260 Godwin Avenue — Wyckoff, N. J.

JOHN J. HARTE CO.
Engineers
Waterworks, Sewerage, Treatment Plants, Gas Systems, Street and Storm Drainage, Improvements
Public Buildings, Airports
ATLANTA, GEORGIA

HAVENS AND EMERSON
W. L. Havens — C. A. Emerson
A. A. Burger — F. C. Tollet — F. W. Jones
H. H. Moseley — J. W. Avery
F. S. Palocsay — E. S. Ordway
Consulting Engineers
Water, Sewerage, Garbage, Industrial Wastes, Valuations—Laboratories
Leader Bldg. — Cleveland 14, O.
Woolworth Bldg. — New York 7, N.Y.

HAZEN AND SAWYER
Engineers
Richard Hazen — Alfred W. Sawyer
Water Supply and Sewage Works
Drainage and Flood Control
Reports, Design, Supervision of Construction and Operation
Appraisals and Rates
122 East 42nd Street — New York 17, N.Y.

HILL & HILL
Engineers
Sewage and Waste Disposal.
Water Supply and Filtration.
Dams, Reservoirs, Tunnels.
Airport and Topographic Surveys
Home Office: 8 Gibson St., North East, Pa.

WILLIAM T. HOOPER, JR. CONSULTING ENGINEERS
Water Supply, Sewerage and Sewage Treatment; Municipal, Industrial, and Structural Design; Reports, Supervision, and Laboratory Service
804 Belvidere Street — Waukegan, Illinois

JONES, HENRY & WILLIAMS
Consulting Sanitary Engineers
Water Works
Sewerage and Treatment
Waste Disposal
Security Bldg. — Toledo 4, Ohio

Engineering Office of
CLYDE C. KENNEDY
- Water Supply
- Sewage and Waste Treatment
- Sewage Reclamation

CHEMICAL and BIOLOGICAL LABORATORY
SAN FRANCISCO

PALMER AND BAKER, INC.
CONSULTING ENGINEERS — ARCHITECTS
Surveys-Reports-Design-Supervision-Consultation
Transportation and Traffic Problems
Tunnels-Bridges-Highways-Airports-Industrial Buildings
Waterfront and Harbor Structures, Graving and Floating Dry Docks
Complete Soils, Materials and Chemical Laboratories
Mobile, Ala. — New Orleans, La. — Harvey, La.

rather felt this might be advisable. However, I doubt if it would have any great bearing on making more convention facilities available for the meetings.

"These are random thoughts and I hope in the long run some overall good can be accomplished because, naturally, all of the manufacturers are desirous of seeing a healthy increase in the number of superintendents and engineers attending these meetings."

Next month we'll see how we made out at Chicago.

★ ★ ★

News Notes from Brushy Bend — April 21, the New England Water Works Assn. met in Hartford, Conn., in the new Hotel Statler following an inspection of the filter plant.

—May 17—Northwest Ohio Sewage and Ind. Wastes Treatment Conference met in Delta, Ohio. The tour included a view of the world's largest ditching machine at the Gar Wood Plant, and a visit to the sewage plant. Art Robinson, Dir. of Publ. Relns. of Ohio Water Pollution Control Board spoke on "The Legal Aspects of Sewage Treatment"—(next meeting—July 19, Shelby, Ohio).

—May 18—Twenty first spring meeting of Southern Section, Illinois Water Plant Operators; Mt. Carmel, Ill. Luncheon $1.50—Legion Hall.—Inspection Trips to Flintkote Roofing Plant, Snap-On Tool Co. and Mt. Carmel Water Plant.

—May 20—Ladies Night of the Long Island Water Conference at Mitchell's in Greenport.—Cocktails 7:30 p.m.; dinner at 8:00. Choice of roast beef or sea food—$4.50—Some of the gang stayed over night for deep sea fishing the next day.

V.T.Y.—Doc Symons

● ● ●

Stormwater Inlet

(*Continued from page* 97)

is also possible to place the funnel partly beneath the curb so that the inlet grate is next to the curb. In the three-year period since the first installation, and with normal precipitation, there is no record of either ponding or flooding in the inlet areas.

The original installation has withstood three seasons of winter, and there is no evidence of heaving or displacement in any direction by the funnel inlet. The original installation is in a gutter and receives normal traffic flow for that type of

installation. There has been less stoppage at the funnel installation than at adjacent rectangular box type inlets.

The development of the funnel-type inlet has produced a drainage structure of efficient hydraulic characteristics. The funnel shape is symmetrical, which, together with the elbow, provides the ability to discharge stormwater in any direction without impairing either the simplicity of installation or the hydraulic efficiency. The funnel provides a structure which greatly reduces the depth of inlet when compared to most other designs. It is an economical structure both to construct and to install.

Further refinements are in the process of being developed and the continuing study program includes the following: (1) Precast elbows with adjustable heights; (2) further reduction in overall weight; (3) alteration of frame and casting to accommodate valley type grates; (4) adaptation of a series of inlets to serve as a transverse drainage structure; and (5) further study of the shape and size of the structure.

The results of the studies made as a part of the current program indicate the complete feasibility of substituting the funnel-type inlet for the more or less standardized and accepted retangular type of box inlet.

Portions of the information presented in this paper were developed in connection with a thesis submitted to the University of Illinois Graduate College in August, 1954.

• • •

"Scramble System" Delays Vehicular Traffic

A trial installation of the so-called "scramble system" was placed in operation in 1954 at four consecutive intersections along Montgomery Street, in San Francisco, Calif. The installation required some new signals and modification of existing signals in such manner as to provide a separate phase for pedestrians. Careful studies of traffic and pedestrian movements were made both before and after the installation of the new system. It was found that vehicular travel time through the system had increased about 50 percent. Nevertheless, a public opinion poll of both pedestrians and motorists indicated that the new plan was popular. Because of the clearly indicated delay caused by the "scramble system", it is not anticipated that additional installations will be undertaken.

MORRIS KNOWLES INC.
Engineers
Water Supply and Purification, Sewage and Sewerage Disposal, Industrial Waste, Valuations, Laboratory, City Planning
1312 Park Building, Pittsburgh 22, Pa.

HAROLD M. LEWIS
Consulting Engineer—City Planner
Analyses of urban problems, master plans, zoning, parking, airports, subdivisions, redevelopment. Reports—plans—ordinances
15 Park Row — New York 38, N. Y.

WM. S. LOZIER CO.
Consulting Sanitary Engineers
Sewerage, Sewage Disposal, Water Supply, Water Purification, Refuse Disposal
10 Gibbs Street — Rochester 4, N. Y.

METCALF & EDDY
Engineers
Water, Sewage, Drainage, Refuse and Industrial Wastes Problems
Airports — Valuations
Laboratory
Statler Building
Boston 16

BOYD E. PHELPS, INC.
Architects-Engineers
Water Supply and Purification
Sewage and Industrial Waste Treatment
Municipal Buildings
Airfields, Power Plants
Reports & Investigations
Michigan City, Indiana — Indianapolis, Indiana

MALCOLM PIRNIE ENGINEERS
Civil & Sanitary Engineers
Malcolm Pirnie — Ernest W. Whitlock
Robert D. Mitchell — Carl A. Arenander
Malcolm Pirnie, Jr.
Investigations, Reports, Plans
Supervision of Construction and Operations
Appraisals and Rates
25 W. 43rd St. — New York 18, N. Y.

THE PITOMETER ASSOCIATES, INC.
Engineers
Water Waste Surveys
Trunk Main Surveys
Water Distribution Studies
Water Measurements and Tests
Water Wheels, Pumps, Meters
New York — 50 Church St.

RUSSELL AND AXON
Consulting Engineers
Civil—Sanitary—Structural
Industrial—Electrical
Rate Investigations
408 Olive St., St. Louis 2, Mo.
Municipal Airport, Daytona Beach, Fla.

IRBY SEAY COMPANY
Water Engineers—Water Consultants
Water Supply — Water Treatment
Water-use Survey — Water Wastes
516 Goodwyn Inst. Bldg. — Phone 8-2733
Memphis, Tennessee

SMITH & GILLESPIE
Municipal and Consulting Engineers
Water Supply, Water Purification
Sewerage, Sewage Disposal, Drainage
Refuse Disposal, Gas Systems, Power Plants
Airports
Jacksonville — Florida

STANLEY ENGINEERING COMPANY
Consulting Engineers
Hershey Building, Muscatine, Ia. — 327 S. LaSalle St., Chicago 4, Illinois

ALDEN E. STILSON & ASSOCIATES
Limited
Consulting Engineers
Water Supply, Sewerage, Waste Disposal
Bridges—Highways—Industrial Buildings
Studies—Surveys—Reports
Surveys, Reports, Appraisals
209 So. High St. — Columbus, Ohio

FOR RATES FOR THIS SPACE
Write
PUBLIC WORKS MAGAZINE
310 East 45th Street — New York 17, N.Y.

UHLMANN & ASSOCIATES
PAUL A. UHLMANN — H. E. BONHAM
CARL E. KUCK — MYE GRANT
Consulting Engineers
Sewage and Industrial Waste Treatment
Water Supply and Purification
4954-4958 N. High St. — Columbus 1, O.

J. STEPHEN WATKINS
J. S. Watkins — G. R. Watkins
Consulting Engineers
Municipal and Industrial Engineering, Water Supply and Purification, Sewerage and Sewage Treatment, Highways and Structures. Reports, Investigations and Rate Structures.
251 East High Street — Lexington, Kentucky
Branch Office
901 Hoffman Building — Louisville, Kentucky

WHITMAN, REQUARDT and Associates
Engineers — Consultants
Civil—Sanitary—Structural
Mechanical—Electrical
Reports, Plans, Supervision, Appraisals
1304 St. Paul St., Baltimore 2, Md.

ROBERT AND COMPANY ASSOCIATES
Architects and Engineers
ATLANTA
WATER SUPPLY • SEWAGE DISPOSAL • INCINERATORS • POWER PLANTS

PUBLIC WORKS
EQUIPMENT NEWS

Published Monthly **July, 1955**

Rubber Tired Ditcher Cuts Service Trenches

This small, rubber tired ditcher can be used effectively as a "supplementary" machine to a fleet of larger ditchers; it can trench for house services; for gas and electric lines (and water where climatic conditions do not require a deep trench to avoid frost); for all sorts of underground cable . . . for street and railway signal installations; also for lawn sprinkler systems, speaker leads for outdoor theaters, airport lighting systems and even small building foundation footings.

This unit, a model 702, can be equipped with either of two digging booms. One, digging 30 inches deep, can be equipped with either a 2¼-inch or 4½-inch bucket line. The other, digging 40 inches deep, can be equipped with 2½-inch or 5-inch lines. Switching from one digging width to another involves a change which one man, with only hand tools, can do in 15 to 20 minutes. Spoil is placed neatly at the edge of the trench; the angled construction of the ditcher's boom lets the operator dig under sidewalks and

Rugged ditcher which has a wide spread application as a supplementary machine

right up to house foundations, minimizing the amount of hand work on the trench.

The overall width of the ditcher is less than 36 inches, and its weight is under 2,000 lbs., making it possible to haul it in the bed of a light truck, but most users prefer to tow it from job to job. One man can attach it to a standard towing hitch. A light pickup truck, even a passenger car can tow it, and road speeds up to 45 mph are permissible. Additional information from Barber-Greene Co., 400 No. Highland Ave., Aurora, Illinois, or circle No. **7-1** on the coupon.

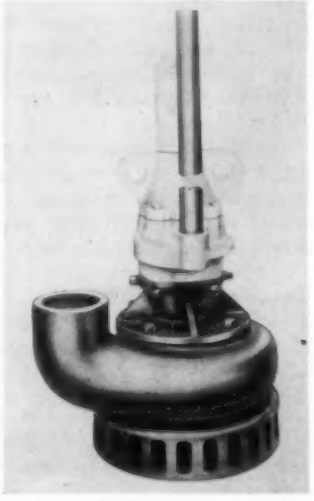
Heavy Duty Loader for Oliver OC-12

A new, heavy-duty loader unit—the model 12 WI for the OC-12 crawler tractor — has been announced by The Oliver Corporation. It is a 1¼-yard capacity machine that permits digging to 30½ inches below ground surface, and raising to a maximum height of 12′ 8″. The bucket has an unusual amount of rollback — 37 degrees — making it easier to take big bites and to carry loads with less spilling. Another advantage is that loads are carried closer to the tractor. Discharge angle of 57 degrees assures smooth dumping of sticky material. Maximum dumping height at bucket hinge pin is 10′ 4″. More from the Oliver Corp., 400 W. Madison St., Chicago 6, Ill., or circle No. **7-2** on the coupon.

Loads carried closer to the tractor is an advantage of this new Oliver loader

Sponge Pump Operated by Compressed Air

Byron Jackson Co. announces a heavy duty, rugged, compact and lightweight pneumatic sponge pump that is ready to go to work by simply connecting it to a 105 or 125 cfm air compressor. No priming is needed. The pneumatic sponge pump has application for use in mine shafts, coffer-dams, caissons, sumps, cisterns, pits, tanks, basements, manholes and bilges; on construction projects, for salvage



Lightweight pneumatic pump is powered by compressor

work or other applications involving the pumping of fluids containing sand and abrasives.

The pump is a single stage centrifugal driven by a rotary air motor operating on compressed air at 60 to 100 PSI, with an air consumption of 57 to 99 cubic feet per minute. It was developed to operate against heads up to 75 feet and for capacities up to 380 gallons per minute. Further information from Byron Jackson Co., Pump Division, P. O. Box 2017, Terminal Annex, Los Angeles 54, Calif., or circle No. **7-3** on the coupon.

Koroseal Makes Root-Proof, Watertight Sewer Joint

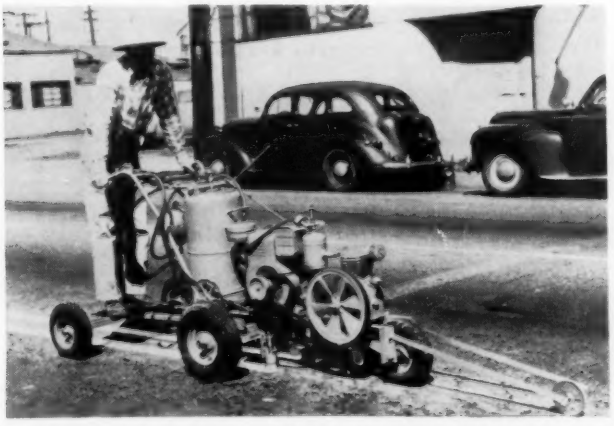
Completely root-proof, watertight, clay sewer pipe lines are easily possible with new Koroseal molding compounds that permanently seal joints, according to The B. F. Goodrich Company Industrial Products Division. The new compounds are supplied in liquid plastic form to clay sewer pipe manufacturers who process the material into tough but flexible sealing rings which prevent infiltration. The finished Koroseal joint is not affected by chemicals, alkalies and acids encountered in underground service. For ease of installation, the molding materials are made to remain flexible at low temperatures, but firm in hot weather. Pipe is furnished with rings of Koroseal material molded permanently at the ends of each pipe section. At the spigot end of the pipe, a Koroseal ring is molded to the outside surface; at the bell end of the pipe, a Koroseal ring is molded to the inside surface of the bell. When the two ends are pushed together, the rings squeeze tightly against each other

Tree roots beware of Koroseal, the new jointing material for clay sewer pipe

to form a mechanical, compression seal that remains effective indefinitely. The new pipe-sealing method reduces costs by simplifying installation; only a few seconds are required to join the pipe lengths. Clay sewer pipe manufacturers licensed by B. F. Goodrich to use the Koroseal joint are producing pipe so equipped in diameters of four, six, eight and twelve inches, with plans to make up to 36 inches. More from B. F. Goodrich Co., Akron, Ohio, or circle No. **7-4** on the coupon.

Road Striping Machine Paints Any Kind of Line

You can have sharply defined road line markings with this new self-propelled Mark-Rite marker. It will paint single or double, solid or skip lines. Automatic guns are air actuated, internal atomizing spray type with adjustable fluid control. The spray guns are easily flushed for cleaning and are accessible without disassembling; they are equipped with either spray shields or tubes, whichever you prefer. The shields are spring loaded and will adjust automatically to uneven road surfaces. The guns and shields are at the pivot point of the machine to insure full width lines on curves and turns. The paint tank is vertical, removable and explosion proof (tested F. M. Laboratories). For easier operation the controls for the guns and the clutch are located on the handlebars. The machine will turn freely in either direction with the power on. It can be furnished with a tandem platform type operators' trailer of steel construction and with rubber tires and ball bearing wheels. For literature and information write to Universal Mfg. & Sales Co., 5211 Pacific Blvd., Huntington Park, California, or circle No. **7-5** on the coupon or reply card.



Surface markings sharply defined by this striping machine.

Minimum Clearances Stressed in New Trencher

A new ladder-type Trenchliner has been developed by Parsons, with minimum overall dimensions and reduced weight. Compact design, low center of gravity and low ground bearing pressure are characteristics. These factors allow the machine to work in congested areas normally inaccessible to a trencher of this capacity and reduce transportation problems. With a maximum depth capacity of 8 feet and widths from 16 through 26 inches the Model 155 is suited for sewer, water, gas main and service trenching, general utility and construction jobs. More information from the Parsons Company at Newton, Iowa, or circle No. **7-6** on the coupon.

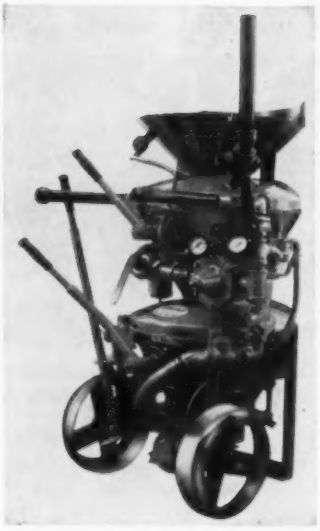
Hydraulic Backhoe and Tractor Shovel

The Henry Hydraulic Backhoe Model C-10 is optional with a hydraulically - controlled telescopic boom digging 10 ft. 6 in. or a standard boom digging 8 ft. Both booms provide a loading height of 8 ft. One of the outstanding features of this backhoe is a new type of parallel circuit control valve which makes possible digging and dumping in one smooth, continuous operation. A new-type regulator valve permits down pressure to be adjusted to suit digging conditions. It digs at any angle within its 160 degree swing radius—a great advantage for digging in those hard-to-get-at places. The Henry Hydraulic Tractor Shovel, Model TS-7, can be equipped with utility bucket, manure fork, hoisting crane, dozer blade or fork lift, as desired—still further enlarging its all-around utility. More data from the Henry Manufacturing Co., Inc., 1700 N. Clay St., Topeka, Kansas, or circle No. **7-7** on the coupon.

Reach hard-to-get-at places with this new digging machine.

Concrete Gunning Machine Handles Six Yards per Hour

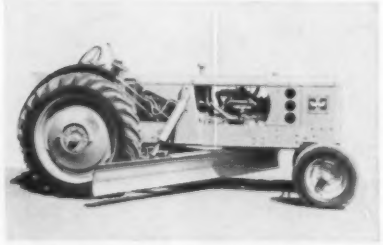
The addition of a new concrete gunning machine to the Air Placement line of equipment is announced. This new machine is the Nucretor, which is designed for use where larger quantities of concrete are to be placed. It has a range of capacities from ½ to 6 cu. yds. per hour. It is possible to gun extremely wet materials satisfactorily with the Nucretor. Like the Bondactors, the new machine can be used to place all types of gunnable aggregates as well as for wet or dry sandblasting. Other recommended uses include: waterproofing; stuccoing; repair and maintenance of concrete, brick, stone and other masonry; fabricating precast wall and roof sections; refractory linings; and the application of insulating concretes. Additional information from Air Placement Equipment Company, 1009 West 24th St., Kansas City 8, Missouri, or circle No. **7-8** on the coupon.



Extra wet materials are no problem with this machine

Maintainer Has Torque Converter and Power Moldboard

This Huber-Warco maintainer features a torque converter and power sliding moldboard as standard equipment. The hydraulic torque converter automatically balances the torque of the engine to meet the load demand of the maintainer, at the same time protecting from shock-loads and increasing working life. Also standard is a power sliding moldboard which adds greatly to the working capacity of the unit. On the job it means no deviation from the line of travel as an operator approaches culverts, abutments, or posts. Either gasoline or diesel power is available, with five speeds from 1.7 to 21 miles per hour. The new maintainer weighs 7,200 pounds with calcium chloride solution in the rear tires. Hydraulic brakes are standard. Actually this is many machines in one. With its hydraulically controlled attachments, it will perform service as a bulldozer, lift-loader, side dozer, berm leveler, broom, patch roller, mower or snow plow. Among improvements made on attachments and accessories, the cab has been redesigned to permit the top half to be removed in warm weather. For more details on the new Maintainer, write Huber-Warco Company, Marion, Ohio, or circle No. **7-9** on the coupon.



Standard equipment includes torque converter and powered moldboard

Wheel-Type Ditcher for All Kinds of Trenching

A new pipeline and utility ditcher, the Buckeye model 308, is especially designed for gas, water, oil, sewer, conduit and cable lines. It digs to a maximum depth of 66 ins., with width of cut from 16 to 32 inches and is said to be exceptionally fast and flexible in all types of soils and almost any job condition.

Variation in tread width and bearing area for the tractor-type crawlers, with smooth cast treads, is obtained through a selection of tread pads. Bolt-on grousers are optional. Ground bearing pressure with standard 16-inch tread shoes is a maximum of 5.6 pounds per square inch. Controls have been greatly simplified; all are grouped within easy reach; wheel hoist and conveyor controls are panel mounted and steering controls foot operated. There are 16 digging speeds forward. Excavator wheel speeds and traction speeds are independent of each other. A high-low range shift allows fast speed-up or quick slow-down in digging travel without declutching the engine or stopping the digging wheel, as when maneuvering close to obstructions or when working in varying soil conditions. More from Gar Wood Industries, Inc., Wayne, Michigan, or circle No. **7-10** on the coupon.

New Air Entraining Agent

A new air entraining agent, "Entrex", when added to concrete in properly controlled amounts is claimed to yield the following money-saving properties for its users: Improved durability; superior resistance to the disintegrating effect of freezing, thawing and deicing salts; increased workability; elimination of bleeding, segregation and honey-combing; finer surface texture; greater placeability (plasticity); higher compressive strength; and lower water absorption. "Entrex" meets all Government and ASTM specification. More from Preco Chemical Corp., Garden City Park, N. Y., or circle No. **7-11** on the coupon.

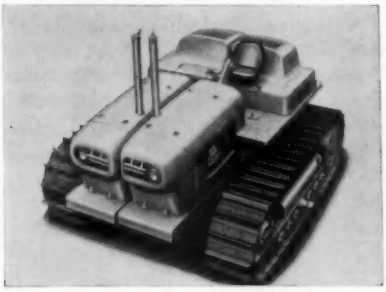
Tractor-Mounted Sweeper for Oliver Tractor

A new tractor-mounted sweeper specifically engineered and built for the Oliver Super 55 Tractor is announced by M-B Corp. The sweeper features a standard broom, 72 ins. long and 32 inches in diameter, which can be turned end for end for more even wear. Broom ground pressure is adjustable and spring loaded to accommodate shocks and bumps; it can be easily mounted and removed. The hood is quickly removed for snow sweeping. The tractor hydraulic system is employed to raise and lower broom with finger-tip control. More from M-B Corp., New Holstein, Wisc., or circle No. **7-12** on the coupon.

Broom specially built for Oliver tractor can be used for light snow removal

Euclid's TC-12 Twin Engine Crawler Now in Production

Euclid Division of General Motors Corporation is now in limited production on its TC-12 Twin-Power crawler tractor. The outstanding feature is the use of two 194-hp. General Motors diesels, each driving one of the tracks through separate Allison Torqmatic Drives. There is no master clutch. Changing from one speed range to another is done under full power. Three speed ranges, forward and reverse, provide speeds to 1.5 mph in low, 3.0 mph in intermediate, and 8.3 mph in high. With separate power train for each track, steering is accomplished by putting either transmission in neutral and using the corresponding steering brake. Tight turns are made by reversing one transmission and keeping the other in forward speed. There are 39 shoes on each track; with 26-in. track shoes, ground contact is 6000 sq. ins. Track gauge is 110 ins., overall width is 136 ins. and overall length is 194 ins. Drawbar height is 23 ins. and ground clearance is 20 ins. Operating weight of the bare tractor is 58,000 lbs. Drawbar pull of the tractor, with normal bulldozer attachments, is 69,750 lbs. dependent on total tractor and equipment weight. More from Euclid Division, GMC, Cleveland, O., or circle No. **7-13** on the coupon.



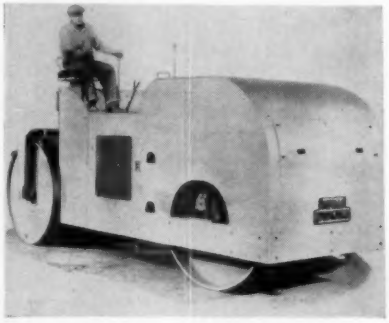
Not the result of a collision, but two Euclid tractors built as a single unit

Factory Packaged pH Control System

The Beckman "packaged" pH control system combines in a single package all the components needed for single or multiple-channel pH process monitoring, recording and controlling. The entire system is built at the factory, wired, piped and assembled ready for plug-in installation. The basic components can be assembled into a number of different combinations from the simple pH meter and alarm to the multiple-channel monitor-recorder-alarm-control system. For information on applications request Bulletin 384 from Beckman Division, Beckman Instruments, Inc., Fullerton 1, Calif., or circle No. **7-14** on the coupon.

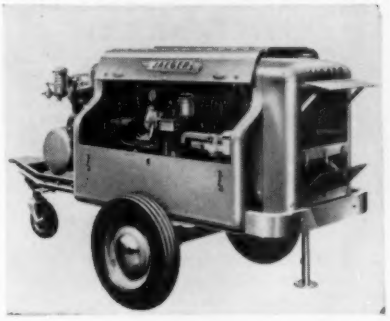
New Tandem Rollers for Better Compaction

Three new two-axle tandem rollers have been introduced by Buffalo-Springfield. These rollers are in the 5-8, 6-9 and 8-10-ton class, and will supplement both the heavy duty line equipment, and the 8-12 and 10-14-ton tandems introduced earlier this year. One of the important features of these new machines is a single-stage heavy-duty torque converter which automatically matches power and speed to variations in material and grade. Steady, constant rolling is maintained at any selected speed from 1 to 5 mph. These new tandem rollers are powered by heavy-duty industrial-type (diesel or gasoline) engines. The engines are fully enclosed for dust-tight operation. Fuller information on these new rollers from Buffalo-Springfield Roller Company, Springfield, Ohio, or circle No. **7-15** on the coupon.



One of three two-axle tandem rollers now available from Buffalo-Springfield

Rotary Compressors Have Slower Speeds, Improved Control



After a year's service by units in the field, Jaeger announces an improved type of two-stage oil-cooled rotary air compressor in 125 and 600-cfm sizes. Continuous control of the engine and compressor is said to have been developed to the point where 100 lbs. minimum pressure is constantly maintained over the entire operating range. Speed modulation is smooth and control is instantaneous preventing over-run and racing of the engine. Controls are simple; there are no metering orifices, complex linkage or toggles. Accessible 8-hour fuel tanks, wrap-around bumpers, and many other desirable features are included. The Model "125" Roto is equipped with tool boxes large enough to carry a complete set of air tools. Its A-frame tow bar has a spring loaded eye and retractable pneumatic tired dolly wheel. For complete information, request Catalog JCR5 from The Jaeger Machine Company, Columbus 16, Ohio, or circle No. **7-16**.

Mobile Gas-Electric Crane Can Handle Twelve Tons

Mobile crane with a 12-ton capacity for wide variety of municipal construction

This mobile crane, rubber-tired, gas-electric, has a capacity of 12 tons and can be used for a wide variety of municipal work. The gas-electric transmission operates with a precision that is especially desirable for such work as laying pipe, placing hydrants and setting valves. The boom has a full-circle swing; and boom lengths of 12 to 30 feet are available. Operation is by gasoline engine turning a generator which provides separate power to the various motors, all of which can be operated individually or at the same time. Fuel consumption averages 1 gallon of gasoline per hour. More from Coles Cranes, Inc., Box 942, Joliet, Ill., or circle No. **7-17**.

CLASSIFIED ADVERTISING

WANTED MANUFACTURERS REPRESENTATIVE

For leading Eastern manufacturer of nationally advertised line of plug, relief and high pressure service valves, meter connections, pipe tapping machine, etc., to contact any one or all of the following: gas utilities, water works, plumbing, heating and industrial supply houses. Straight commission. Partially established, protected, exclusive territories open.

Reply to:

E. S. Boyer, Dir. of Sales
Welsbach Corporation
Kitson Valve Division
Philadelphia 20, Penn.

SEWAGE TREATMENT PLANT OPERATOR WANTED

New 20 MGD sewage plant in Midwest needs experienced operator for 6 to 9 months to start plant in operation. Job may become permanent. Write to Box PW 71, Public Works Magazine, 310 East 45th Street, New York 17.

ASST. CHIEF, WATER PUMPING STATIONS

SALARY: $4930 to $6192 a year

Excellent opportunity with Philadelphia's Water Department. Vocational or high school graduation plus 6 years experience in maintenance and operation of large electrical pumping stations. Three years of experience should have been in supervision. Substitutions of experience or training for above will be considered. Civil service security, health and welfare plans, paid vacations, and sick leave. For further information, contact before March 28, 1956:

PERSONNEL APPLICATION OFFICE
ROOM 127, CITY HALL
PHILADELPHIA 7, PENNSYLVANIA

MUNICIPAL SUPPLIES

WS DARLEY & CO

WRITE TODAY FOR 100 PAGE CATALOG

W. S. DARLEY & CO., Chicago 12

Rubber Tire Roller Has Torque Converter Drive

Smooth handling and full oscillation are among the features of the new Bros SP-54 self-propelled pneumatic tire, 9-wheel roller. This is particularly suitable for mat resurfacing, seal coating and compaction jobs in the shallow lift range. It has 5 front and 4 rear wheels; both rear wheel pairs have positive chain drive; and oscillation of front and rear wheel pairs is available. It will turn on an 18 ft. 5 in. radius. The 9-ton compaction load is evenly distributed over the 9 wheels at 2000 lbs. per wheel, or 265 lbs. per lineal inch of rolling width. Full compaction is obtained by one-half in. overlap of front and rear tires. A 125-gal. water tank is standard equipment, though not required to obtain maximum wheel load. Towing tongue is optional. Full data from Wm. Bros Boiler & Mfg. Co., 1057 Tenth Ave. S. E., Minneapolis 14, Minn., or circle No. **7-18.**

Pneumatic tire roller, 9 wheels, with a 9-ton compaction evenly distributed

Cutting Contraction Joints in "Green Concrete"

For cutting contraction joints in "green concrete", Clipper has developed the "GreenCon" blades for cutting the widest possible range of "hard" to "soft" limestone aggregates—plus coral, steel mill slag, and the same aggregates with small percentages of granite, crushed river gravel, etc. With the new blades, tremendous savings are possible by cutting "green concrete" with low-cost abrasive blades. Further information is available from Clipper Manufacturing Company, Suite 745, 2800 Warwick, Kansas City 8, Missouri, or circle No. **7-19.**

The Target Self-Propelled Concrete Saw

Powered by a 36-hp engine, the new Model 360 concrete saw has forward speeds of 1 to 25 feet per minute, with finger-tip control by the operator who can, while the saw is in motion, adjust the precise speed at which the blade cuts. Hydraulic pressure feeds the blade into the concrete as gently, or as fast, as desired, and lifts the blade out of the cut in a single sweep at the end of the cut. Blade depth can be accurately adjusted while the saw is in motion; a revolving pointer with indicator visually recording the sawing depth. The blade is held arrow-straight on the cutting line—the wide spaced wheels "bridging" over uneven surfaces and resisting side drift when cutting on slopes. A force pressure water pump flushes the sludge out of the cut to give fastest cutting speed and maximum blade life. More from R. G. Evans Co., 6315 Brookside Plaza, Kansas City, Mo., or circle No. **7-20** on the coupon.

Continuous Analyzer for Free Residual Chlorine

A new residual chlorine analyzer, available from Leeds & Northrup Company, provides an automatic check on Cl_2 content in chlorinated water. Functioning on the Coulometric principle, the instrument makes a continuous electrical titration for Cl_2 content, and incorporates an L&N Speedomax recorder to chart the variable. Ask for data sheet ND46-94(1) from Leeds & Northrup Company, 4934 Stenton Avenue, Philadelphia 44, Penna., or circle No. **7-21** on the coupon.

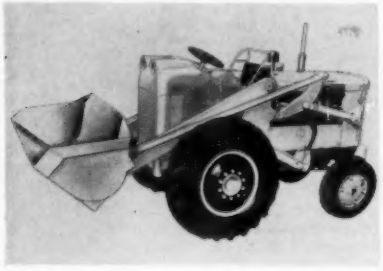
Remote Electrical Transmission Instrument

Recently developed and now being marketed is a new unit, designated the Orthoflow, by Simplex. This is essentially an electric transmission system utilizing a two-wire circuit. It was designed for installation where accurate transmission of flow or other measurable data is required over distances and it is not possible to obtain data through the use of mechanical measuring devices. It can be adapted to transmit data over private wires in in-plant services or, with the addition of a few simple parts, over leased telephone channels where accurate transmission of data over many miles may be accomplished. It is effective over a wide range of measurements with an accuracy of plus or minus 2 percent.

This system may be applied for the transmission of flow, liquid level, or pressure measurement. It can be adapted for installation in critical locations where explosion-proof characteristics may be required. More from Simplex Valve & Meter Co., 7 East Orange St., Lancaster, Pa., or circle No. **7-22** on the coupon.

Tip-Back Bucket for Tracto-Loader

A larger 1-yd. bucket with 25° of tip-back at ground level is announced by Tractomotive Corporation for its TL-10 Tracto-Loader. The width of the bucket has been increased, allowing it to be operated flush against walls and into corners. This feature, together with the machine's 11-ft. turning radius, makes



Bucket capacity of this machine has been increased to a full cubic yard

it ideally suited for many loading operations both indoors and out. Advantages of the tip-back action, and the resulting low carrying position, include bigger loads, faster loading, better operator vision, increased ability to carry heaped loads without spillage, and better overall stability and balance. More from Tractomotive Corp., Deerfield, Ill., or circle No. **7-23** on the coupon.

An Elastic and Durable Floor Material

A new concrete-type industrial flooring and construction material has been developed that "gives" without cracking under heavy loads, dampens shock and noise, resists alkalies and mild acids, is waterproof and has a non-slip quality. The material is a combination of liquid rubber and a special cement powder and is called Laticrete. The rubber content makes it flexible, gives the cured mix "bounce" and insures a tight bond. Test patches in factories show virtually no wear after two years of high-volume traffic. The concrete-rubber mix is a surface coating and can be used for repair work or in new installations. It has good adhesion and a ¼-inch layer, the suggested thickness, will support heavy loads when put over a hard base. It is available in a wide range of color.

Laticrete comes in two parts—the powder and a liquid rubber—and is prepared like regular concrete. One of the few requirements is that it must be applied to a clean surface. Otherwise it is handled like concrete or mortar and can be trowelled or buffed to give a smooth surface. More from Naugatuck Chemical Div., U. S. Rubber Co., Rockefeller Center, New York 20, N. Y., or circle No. **7-24**.

7 or 11-Wheeled Rubber Tired Rollers

Two new self-propelled, rubber-tired rollers, one with 7 wheels, and the other with 11 wheels, each weighing 25 tons when fully ballasted with sand, are now available. Both rollers are equipped with gasoline or diesel engines and special transmissions, providing six speeds forward and six reverse, operating equally well in either direction. Large diameter tires, for light draft and high rolling speed, are arranged to conform to U. S. Corps of Engineers' specifications. Pressures up to 795 lbs. per inch of tire width may be obtained. Hydraulic steering mechanism provides easy maneuverability. These rollers are particularly suitable for compacting earth, crushed rock, gravel and similar materials. The Model 2511, with 11 tires, giving complete coverage, is most effective for rolling asphalt and other paving materials. More from Shovel Supply Company, Dallas, Texas, or circle No. **7-25** on the coupon.

• • •

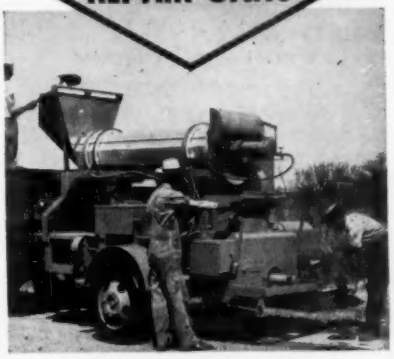
Jobs for Engineers

There are a number of vacancies for civil engineers in the New York District, Corps of Engineers, both in New York City and in New York State and New Jersey. These positions range in salary from $3410 to $5940 per year. Information from Personnel Branch, 111 East 16th St., New York 3, N. Y.

Walter Johnson is Chief Highway Engineer of Kansas

Walter G. Johnson has been appointed chief highway engineer of the Kansas State Highway Commission. He has been with the Kansas Highway Commission since 1928, and since 1945 has been Engineer for Secondary Roads. He is a graduate of the Colorado School of Mines and a member of Kansas Engineering Society, NSPE and ASCE.

PATCH
PAVING
At Lower Cost
with
WYLIE
REPAIR UNITS



Portable Hot Asphalt Plant
Single Unit Heats & Mixes

Tow your **PATCHMOBILE MODEL PM-215** to the job . . . and have all the equipment you need for hot asphalt patches! Features rotary dryer, asphalt tank, pugmill, power asphalt pump, spray attachment, volumetric asphalt measuring device and tool-heating compartment . . . all in one unit. With Patchmobile PM-215 there's no manual handling of aggregate and asphalt from charging hopper to discharge chute.

Truck Tailgate Asphalt Mixer
Compact Pugmill and Heater

Use **HEAT-A-MIX** to make cold stockpile material as workable as fresh hot-plant mix! This compact, high-capacity pugmill and material heater has its own gasoline engine and propane heating system. Heat-A-Mix mounts quickly and easily by interchanging with truck tailgate. Runs forward and reverse.

Get Complete Information

Clip Coupon For Catalogs

Name _____
Address _____
State _____

WYLIE MANUFACTURING CO., INC.
Bx 7086 (Zone 12) Okla. City

INCREASE SEWAGE PLANT CAPACITY WITHOUT CAPITAL COST!

WHAT IS IT?

- BIONETIC is a dry powder of preserved beneficial groups of micro-organisms that accelerate natural biological action.

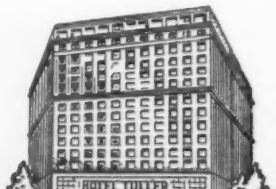
WHAT DOES IT DO?

- BIONETIC can save money on sewage plant problems including odor control, increased sludge digestion capacity, and scum blanket control.

INTERNATIONAL ACCEPTANCE:

- BIONETIC is succesfully used by hundreds of municipalities, industries, resorts, and institutions.

For FREE Literature Write:
A. J. Krell, technical director
Reliance Chemicals CORPORATION
P. O. BOX 6724 HOUSTON 5, TEXAS



HOTEL TULLER

. . featuring convenience, comfort, quality! A cosmopolitan atmosphere in home-like setting. In the center of all downtown activities. Newly decorated. Ultra modern, comfortable guest rooms . . excellent food at moderate prices in our modern coffee shop and cafeteria.

Radio and Television in room.
Air Conditioned rooms in season.

800 ROOMS WITH BATH from $3.75
GARAGE and PARKING LOT
FAMILY RATES
No Charge for Children 14 and Under —
Harry E. Paulsen General Manager
FACING GRAND CIRCUS PARK
DETROIT

INDEX OF ADVERTISEMENTS

Abrams Aerial Survey Corp. 143
Acker Drill Co., Inc. 120
Adams Co., Inc., R. P. 6
Air Survey Corp. 143
Alabama Pipe Co. 34
Albright & Friel, Inc. 143
Allied Chemical & Dye Corp. 47
Allis-Chalmers ..... 16 & 17
Alvord, Burdick & Howson 143
American-Marietta Company 19
Armco Drainage & Metal Prod. Inc. 37
Ayer-McCarel Clay Co., Inc. ..... 50 & 51

Badger Meter Mfg. Co. 35
Baker, Jr., Michael 143
Bannister Engineering Co. 143
Barber-Greene Co. 54
Barker & Wheeler 143
Bell, Howard K. 143
Black & Veatch 143
Bogert & Childs 143
Bowe, Albertson Assoc. 143
Bowerston Shale Co. ..... 50 & 51
Brooks Chemicals, Inc. 133
Brown & Blauvet 143
Brown Company 137
Brown Engineering Co. 143
Brown, Floyd G. & Asso. 143
Buck, Seifert & Jost 143
Buffalo Pipe & Foundry Corp. 132
Burgess & Nipple 143
Burke, Inc. R. H. 143
Burns & McDonnell Engr. Co. 143
Byron Jackson Co. 63

Caird, James M. 143
Calgon, Inc. 11
Camp, Dresser & McKee 143
Cannelton Sewer Pipe Co. ..... 50 & 51
Capitol Engineering Corp. 143
Cast Iron Pipe Research Assoc. ..... 12 & 13
Caterpillar Tractor Co. 4, 66, 119
Champion Mfg. Co. 138
Chester Engineers 143
Chicago Pump Co. 3
Classified Ads 150
Cleveland Trencher Co. 60
Clow & Sons, James B. 55
Cole & Sons, Chas. W. 143
Combustion Engineering 129
Consoer, Townsend & Assoc. 143
Convevor Company 32
Cotton, Pierce, Streander, Inc. 144

Darley & Co., W. S. 150
DeLeuw, Cather & Co. 144
Dempster Brothers, Inc. ..... 14 & 15
Detectron Co. 102
Dickey Clay Mfg. Co., W. S. ..... 50 & 51
Dietz, R. E. Company 46
Dolge, C. B. 139
Dotmar Industries Inc. 120

Enterprise Engine & Machinery Co. 36

Fairbanks Morse & Co. 53
Federal Sign & Signal Corp. 112
Fisher Research Lab., Inc. 106
Fitchburg Engineering Corp. 26
Flexible Inc. 38
Flexible Pipe Cleaning Co. 138
Ford Motor Company 59
Tractor & Implement Div.
Foster Engineering Co. 139
Fridy, Gauker, Truscott & Fridy, Inc. 144

Galion Iron Works & Mfg. Co. 2
Gannett, Fleming, Cordroy & Carpenter, Inc. 144
Gilbert Associates, Inc. 144
Greeley & Hanson 144
Green Co., Howard R. 144
Greenlee Tool Co. 48
Greer Engineering Associates 144
Gulf Oil Corp. 57

Hagan Corp. 11
Hamilton Kent Mfg. Co. 111
Harley & Assoc., Frank E. 144
Harte Co., John J. 144
Hauck Manufacturing Co. 122
Havens & Emerson 144
Hazen & Sawyer 144
Heltzel Steel Form & Iron Co. 30
Hill & Hill 144
Homelite Corp. 61
Homestead Valve Mfg. Co. 22
Hooper, William T. 144
Hotel Tuller 152
Hough Co., Frank G. ..... 42 & 43
Hydrauger Corp., Ltd. 102

International Salt Co., Inc. 31

Jaeger Machine Co. ..... 8 & 9
Johns-Manville 155
Johnston Pump Company 39
Jones, Henry & Williams 144

Kennedy, Clyde C. 144
Kerrigan Iron Works, Inc. 121
Knowles, Inc., Morris 145
Komline-Sanderson Engineering Corp. 113
Kwik-Mix Co. 44

Layne & Bowler Pump Co. 20
Leopold, F. B. 132
Le Rol Company 107
Div. of Westinghouse Air Brake
Le Tourneau-Westinghouse Co. 41
Lewis, Harold M. 145
Link-Belt Co. 23
Littleford Bros., Inc. 40
Lozier & Co., Wm. S. 145
Lyle Signs Inc. 122

M-B Corp. 10
M & H Valve & Fittings Co. 116
Master Builders Co. 140
McConnaughy, K. E. 58
McWane Cast Iron Pipe Co. 130
Metcalf & Eddy 145
Morse Bros. Machinery 136
Morton Salt Company 141
Motorola Comm. & Electronics, Inc. 45
Mueller Co. ..... 28 & 29

Natco Corp. ..... 50 & 51
National Clay Pipe Mfrs., Inc. 65
Northern Gravel Company 44

Oliver Corporation 27
Orangeburg Mfg. Co., Inc. 52

Pacific Flush Tank Co. 21
Pacific States Cast Iron Pipe Co. 130
Palmer & Baker, Inc. 144
Phelps, Inc., Boyd E. 145
Pirnie Engineers, Malcolm 145
Pitometer Company 145
Pittsburgh Equitable Meter Div. 127
Pomona Terra-Cotta Co. ..... 50 & 51
Portland Cement Assn. 105
Preload Company, Inc. 114
Prescott Tool Co., Inc. 36
Public Works ..... 131 & 142

Reliance Chemicals Corp. 152
Robert & Co., Assoc. 145
Roberts Filter Mfg. Co. 18
Rockwell Mfg. Co. 127
Russell & Axon 145

Seay Co., Irby 145
Sherman Products, Inc. ..... 108 & 109
Smith & Gillespie 145
Solvay Process Div. 47
Sparling Meter Company 140
Stanley Engineering Co. 145
Stillson Assoc., Alden E. 145

Taylor & Co., W. A. 153
Tennessee Corp. ..... 62 & 153
Texas Vitrified Pipe Co. ..... 50 & 51
Tilden Tool Mfg. Co. 34
Traffic & Street Sign Company 123
Trickling Filter Floor Institute ..... 50 & 51
Trojan Mfg. Co. 142
Tropical Paint Co. 56

U. S. Pipe & Foundry Co. 115
Universal Mfg. & Sales Co. 24
Uhlmann & Associates 145

Wallace & Tiernan Inc. ..... Back Cover
Watkins, J. Stephen 145
Weil Pump Company 117
Western Machinery Company 135
Westinghouse Electric Corp. 64
Weston Co., L. A. 18
White Motor Company 49
Whitman, Requarpt & Assoc. 145
Wilkinson Products Co. 154
Willys Motors, Inc. ..... 124 & 125
Wolverine Tube
Division of Calumet & Hecla, Inc. 25
Wood Co., R. D. 128
Wylie Mfg. Co., Inc. 151

—Worth Seeing

Almost $2 million worth of earthmoving equipment was paraded before Exposition visitors on Caterpillar's Peoria Proving Ground. A number of the machines go through their paces as distributors and field representatives watch the show.

Making light of a burden—This young lady, carrying a metal lighting pole, isn't as strong as she may seem. Made by the Hubbard Aluminum Products Co., the pole weighs only 40 lbs.

At last—a place to park! All you have to do is to drive to San Jose plant of the Ford Motor Co., at Milpitas, Calif., where you will find this. Flexbeam guardrails shown are by Armco Drainage and Metal Products, Inc., Middletown, Ohio.

SODIUM SILICOFLUORIDE

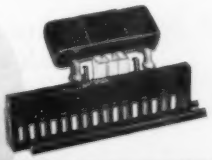
(Fluosilicate)

Inquiries Invited!

TENNESSEE TC CORPORATION

1028 Connecticut Ave., N. W.
WASHINGTON 6, D. C.

TEST pH, CHLORINE *ON THE SPOT*



with TAYLOR COMPARATORS

ACCURATE, yet easy

1. **Place sample right in comparator tubes**
2. **Add reagent to middle tube only**
3. **Move the color standard slide across until colors match and read direct.**

That's all . . . and you get an immediate reading of pH, chlorine or bromine. Complete water analysis, including fluorides, is only a little more detailed when you use a Taylor Water Analyzer. All sets are lightweight, portable and durable . . . many serve for several determinations with only a change of color standard slide.

COLOR STANDARDS GUARANTEED

Taylor liquid color standards carry an unlimited guarantee against fading . . . no danger of mechanical inaccuracy.

SEE YOUR DEALER for Taylor sets or write direct for FREE HANDBOOK, "Modern pH and Chlorine Control". Gives theory and application of pH and chlorine control. Illustrates and describes full Taylor line.

SERVING SCIENCE AND INDUSTRY 1930 1955 FOR 25 YEARS

W. A. TAYLOR AND CO.
7304 YORK RD. • BALTIMORE-4, MD.

WILKINSON LINE LOCATOR

DESIGNED RIGHT
BUILT RIGHT

This precision instrument accurately spots every buried pipe and cable anywhere

It will indicate the depth too.

This substantial carrying case is available

The WILKINSON LINE LOCATOR provides low cost insurance against trouble.

Its dependability is recognized by leading utilities everywhere.

WILKINSON PRODUCTS COMPANY

3987 Chevy Chase Drive
PASADENA 3, CALIFORNIA
Tel. SYlvan 0-4314

WORTH TELLING

by Arthur K. Akers

★ PAUL F. VOLLMER has succeeded A. E. Hohman as advertising manager, Blaw-Knox Company, Pittsburgh. The latter becomes coordinator of special sales activities.

★ SHERMAN PRODUCTS INC., Royal Oak, Mich., tractor-mounted trenchers, promotes Walter L. Beers to manager for the Northwest.

★ THE WHITE MOTOR CO., a leading truck manufacturer, expands with the purchase of the Diesel Engine Division, The National Supply Co., Springfield, Ohio. William F. Burrows is division general manager.

Mr. Burrows

Mr. Williamson

★ A. O. "Archie" WILLIAMSON, manager Road Machinery Division, Wm. Bros Boiler & Manufacturing Co., Minneapolis, we are pleased to note is a newly-elected member of the Bros board of directors.

★ BUEL M. WALLIS, former general sales manager, J. D. Adams Division of LeTourneau-Westinghouse Co., is now general sales manager, the Schield Bantam Co., Waverly, Iowa.

★ M. H. STRICKLAND of St. Louis office is transferred to manager of industrial sales, Chicago district, for all divisions of B-I-F Industries, Providence.

★ CATAPHOTE CORPORATION, Toledo, and Jackson, Miss., appoints R. B. Wood sales manager. He was formerly with Eagle Crusher Co., Galion, Ohio. Also, Cataphote has been made distributor for Alcoa aluminum highway and safety sign blanks.

★ PAUL G. DUNMIRE becomes vice president, manufacturing, of

Mr. Dunmire

Mr. Morriss

Smith-Blair Inc., South San Francisco. James C. Morriss, Jr. joins them as chief engineer.

★ E. B. COTTINGHAM moves up from vice president to president, Henry Pratt Co., (butterfly valves) Chicago.

★ FORD D. BROWN is the new mid-eastern representative of the Gorman-Rupp Co., (pumps) Mansfield, Ohio.

★ A. C. THOMAS promoted from a division sales manager to assistant general sales manager, The Jaeger Machine Co., Columbus. Emil L. Baugh, of Albany, Ga., succeeds him as division sales manager.

★ WALLACE & TIERNAN CO. appointments include J. C. Brigham, chief engineer; L. E. Demler, manager of the Division of Technical Services.

★ ENTERPRISE ENGINE & MACHINERY CO., San Francisco, names Robert M. Pearson field sales manager; L. C. Michie St. Louis district manager. (Diesels).

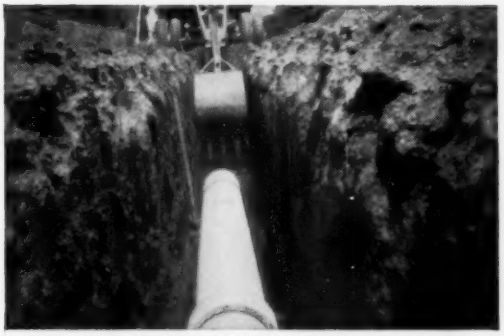
★ GEORGE A. BAER is advanced to application engineer, Valve Sales Division, the S. Morgan Smith Co., York, Pa.

★ IN the days when a woodshed stood behind the American home, much of what now passes for juvenile delinquency was settled out of court.

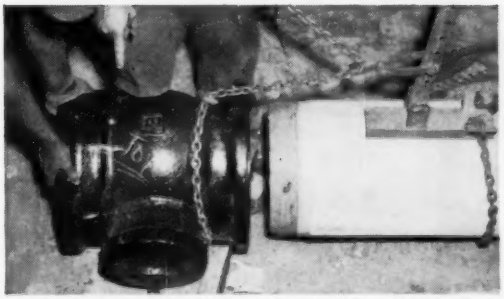
—Wood Chuckles

Municipal officials say
Installation time can be cut beyond all expectations!*
. . . and you'll get peak performance, too, with Transite Pressure Pipe and the NEW Ring-Tite Coupling

Easy handling, fast assembly



Installation follows digger closely



Ring-Tite Fittings, too—You can join Transite Pipe directly to fittings, valves and hydrants embodying the Ring-Tite design . . no special tools needed, no poured joints

Municipal officials have found that with Transite® Pressure Pipe and the Ring-Tite® Coupling, installed costs are lower, performance is higher. Contractors can install it faster, and once installed, it maintains its high flow capacity year after year . . . keeps pumping costs low . . . may mean smaller pipe size to start.

Both Transite Pressure Pipe and Ring-Tite Coupling are made of asbestos-cement. Strong and durable, this material cannot rust, is highly resistant to corrosion, will not tuberculate.

With Ring-Tite, installed costs are less—assembly follows the digger closely. The special coupling design permits quick, easy alignment. To assemble, rubber rings are simply popped into grooves. Then lubricated pipe-ends slide in under the rings easily, smoothly, and surely.

Pipe ends stop positively and are positioned accurately—with ends automatically separated within the coupling. This gives the line flexibility to withstand shock and vibration, relieves line stresses, permits conformance to curves.

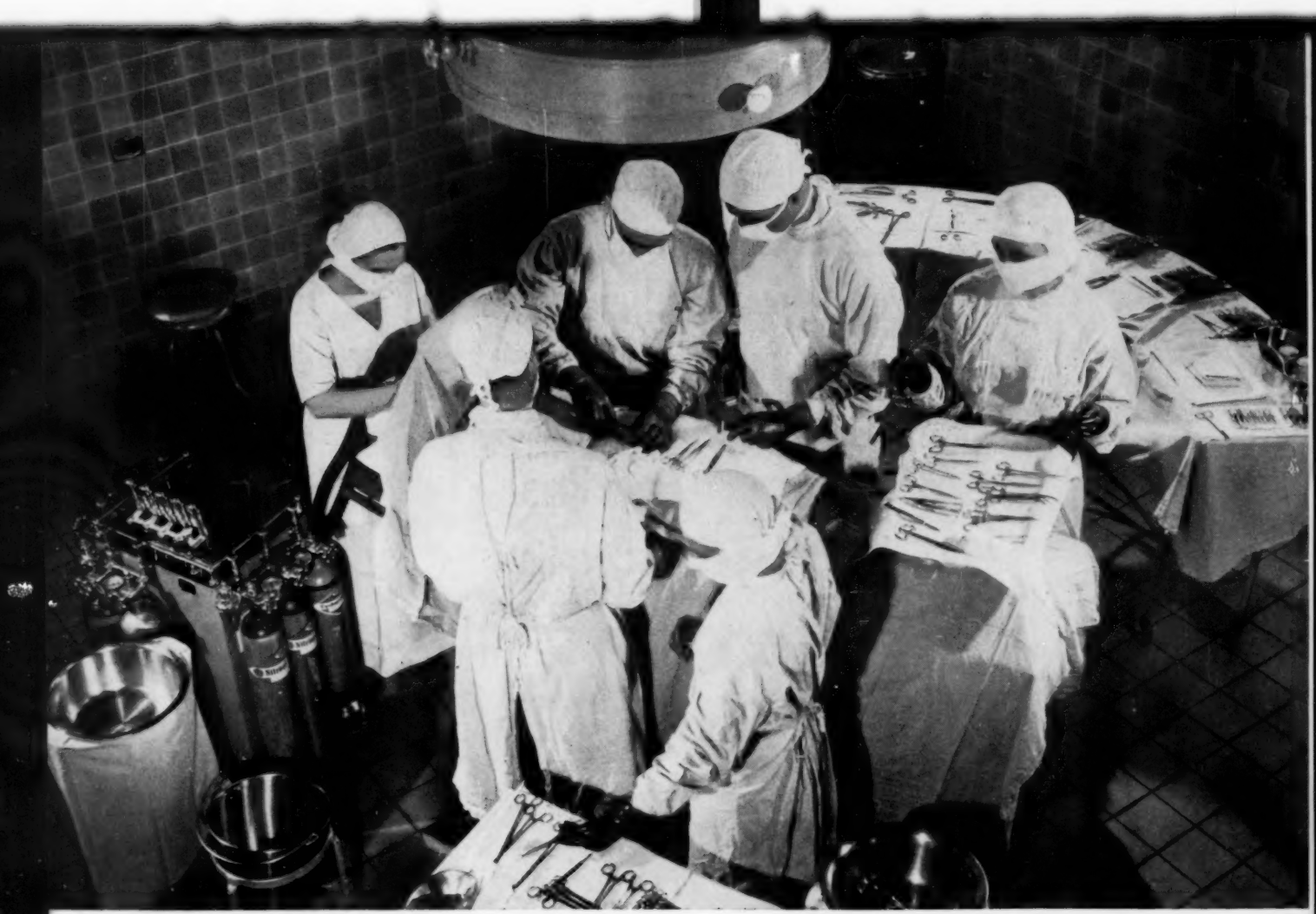
For further information write Johns-Manville, Box 60, New York 16, N. Y.

*Excerpt from actual field report: "Exceeded by far the installation speed anticipated under job conditions."

JOHNS-MANVILLE JM PRODUCTS

Johns-Manville TRANSITE PRESSURE PIPE

WITH **NEW RING-TITE** COUPLING



THE W & T FIELD ORGANIZATION, TOO, MEANS . . .

. . . *Strength in Depth*

Just as the surgeon depends on the group around him, as well as his own skill . . . so your **W&T** chlorination equipment is strengthened by the organization behind it.

The **W&T** field organization, all of whom are factory trained and qualified, is always available on short notice to supervise the installation of **W&T** equipment, to render service and assistance regarding your chlorination or chlorinator problems, and to provide equipment and service in times of disaster.

W&T research and development engineers are always seeking out new designs, principles and materials. **W&T** chemists and bacteriologists are always trying to find new processes for the improvement of water and sewage treatment.

When you depend on **W&T** equipment, you have the assurance that 40 years of experience by this team is being used to bring you the best in service, design and dependable performance.

"Make Your First Choice Equipment That Lasts"

WALLACE & TIERNAN INCORPORATED

25 MAIN STREET, BELLEVILLE 9, NEW JERSEY

S-97